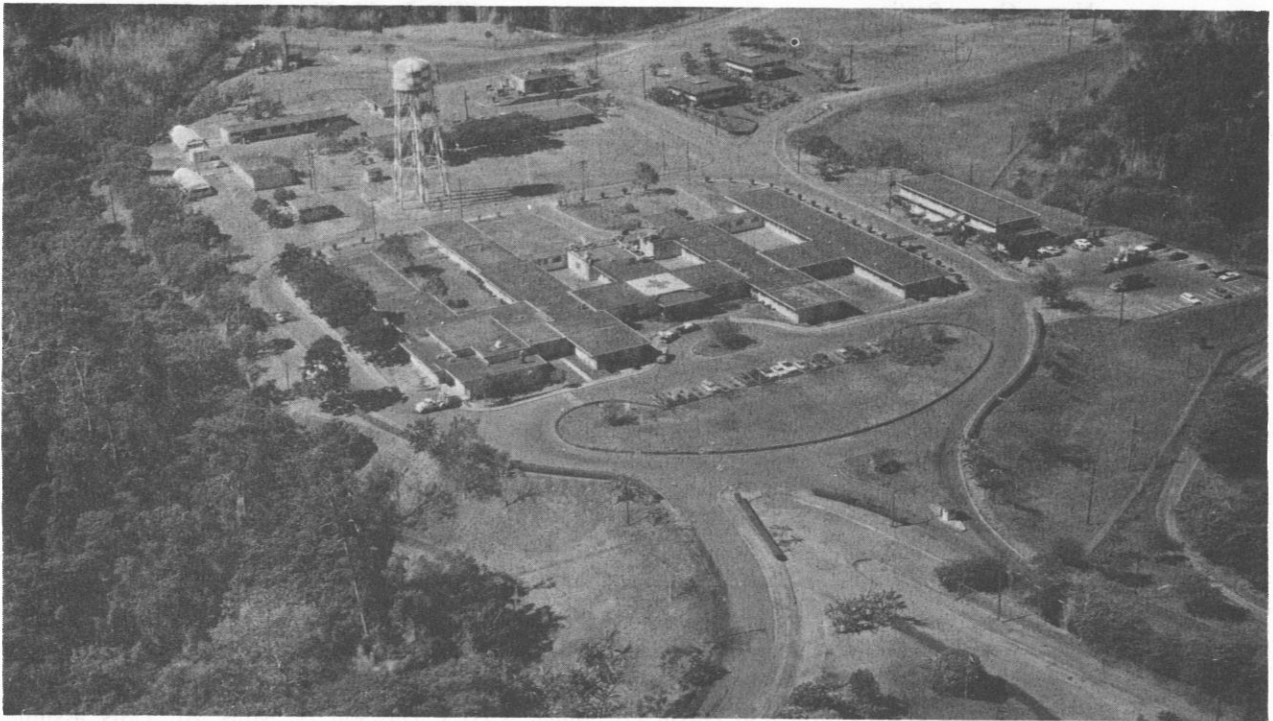


UNITED STATES NAVY *Medical News Letter*

Vol. 48

Friday, 21 October 1966

No. 8



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United States Navy
MEDICAL NEWS LETTER

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The U.S. Navy Medical News Letter is basically an official Medical Department publication inviting the attention of officers of the Medical Department of the Regular Navy and Naval Reserve to timely up-to-date items of official and professional interest relative to medicine, dentistry, and allied sciences. The amount of information used is only that necessary to inform adequately officers of the Medical Department of the existence and source of such information. The items used are neither intended to be, nor are they, sus-

ceptible to use by any officer as a substitute for any item or article, in its original form. All readers of the News Letter are urged to obtain the original of those items of particular interest to the individual.

Change of Address

Please forward changes of address for the News Letter to Editor: Bureau of Medicine and Surgery, Navy Department, Washington, D.C. 20390 (Code 18), giving full name, rank, corps, old and new addresses, and zip code.

FRONT COVER: Aerial view of the U.S. Naval Hospital, Subic Bay, Philippines. On 1 April 1966, the U.S. Naval Hospital, Subic Bay, Philippines was formally commissioned, thus becoming the twenty-fifth of the Navy's continental and extra-continental Naval Hospitals. CAPT Dawson A. Mills MC USN assumed command.

The mission of the hospital, as defined by SecNav Notice 5450 of 4 March 1966 is, "to provide general clinical and hospitalization services for active duty Navy and Marine Corps personnel, active duty members of the other armed services, dependents of active duty personnel, and other authorized persons as outlined in current directives; to cooperate with military and civil authorities in matters pertaining to health, sanitation, local disasters, and other emergencies."

The Naval Hospital, Subic Bay has been experiencing an average daily census of 94 inpatients with many days over 100. Outpatient care has doubled in the past three years.

The current staff of 17 doctors, 14 nurses, 5 Medical Service Corps officers, 51 hospital corpsmen, and 64 civilian employees provide professional services of Medicine, Surgery, Obstetrics and Gynecology, Orthopedics, Psychiatry, Radiology, Pediatrics, Ophthalmology and Optometry to the base and adjacent population of over 20,000 persons as well as a daily average of over 5,000 fleet personnel.

The issuance of this publication approved by the Secretary of the Navy on 4 May 1964.

EXTRA THORACIC ASSISTED BREATHING (ETAB)

A PRELIMINARY REPORT

CAPT Joseph L. Whatley MC USN and Irving Rehman PhD**.*

The use of an external respirator which encloses the thoracic cage and upper abdomen as an aid in the early diagnosis of chronic pulmonary diseases such as asthma and emphysema has previously been reported.¹ Movements of the diaphragm in over fifty normal, asthmatic and emphysematous individuals were studied by means of cinefluorography.

In these studies, an external, alternating positive and negative pressure was applied within a plastic cuirass to the thorax by means of the "Vital Capacitator" (Hemo-Dyne Corporation, Santa Anna, Calif.), to assist and enhance the thoracic cage and diaphragmatic movements. Both the rate and depth of inspiration and expiration were controlled and varied by this unit, in order to better study the more tenuous movements of the diaphragm.

Studies of the diaphragm visualized by cinefluorography in these fifty cases revealed typical movements in the healthy, as well as in several diseased states. All portions of the normal diaphragm move synchronously during inspiration and expiration. The initial and more pronounced movement of the thoracic cage occurs in the lower-most portion. There is a "doming up" of the diaphragm, which begins medially and then continues laterally to the chest wall producing an excursion on inspiration and expiration of approximately three interspaces. The costophrenic angle, or sinus, is clear on both inspiration and expiration.

In the asthmatic, the excursion is not as great. There is no "doming-up", as in the normal, and there is no medio-lateral component. There is a peculiar jerkiness or "cog-wheel" movement of the diaphragm in asthmatics. As would be expected, the expiratory phase is prolonged.

In the typical emphysema patient, the costophrenic angle or sinus is obliterated. The rib cage remains relatively immobile during respiration. Widening of the rib interspaces occurs producing the "barrel-chest". The diaphragm appears as almost a straight

line. There is no "doming-up", as observed in the normal. Although there is a medio-lateral component to the diaphragmatic movement, it was noted that the lateral portion of the diaphragm is the first to cease movement in emphysema. In moderately advanced cases, only the medial portion of the diaphragm moves during respiration, but in far advanced cases there is barely perceptible movement of any portion of the diaphragm. In these cases, most of the air exchange is due to the use of the accessory muscles of respiration.

It is the expiratory phase of respiration which is difficult for both asthmatic and emphysematous individuals. Intermittent positive pressure breathing (IPPB) does not help this phase of respiration. The use of an external extra-thoracic, assisted breathing cuirass-type respirator with both positive and negative phases (ETAB) plus accurate control of rate, depth and rest aids both inspiration and expiration.

A comparison study between IPPB and ETAB in dogs was reported by Getzen et al.² The tidal volume can be enhanced greatly by the use of ETAB, and studies in dogs show that increases up to 4½ times normal could be effected with ETAB, with no danger to the subject. However, pressures of about 40 cms H₂O with IPPB was found to be potentially dangerous.

The increase in tidal volume using ETAB was confirmed by studies of diaphragmatic movements with cinefluorography. These studies show that the diaphragmatic excursion is increased both on inspiration and expiration during ETAB. With IPPB, the expiratory phase remains a passive one, and IPPB has no direct effect on it.

IPPB interferes with the return filling of the right side of the heart. ETAB enhances the filling of the right side of the heart, as shown by cinefluorography and densitometry studies. In these studies there appears to be an increased cardiac output, and increased blood flow both in the pulmonary and the systemic circulation during ETAB. There is an increase in temperature over the major arteries during and after the use of ETAB, as measured by Ther-

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Figures I and II Show the ease of application and comfort to the patient in either the standing, sitting or supine position. The cuirass is applied either over the patient's head by having him extend the arms overhead or the patient may simply step into the cuirass as though putting on a pair of trousers. The cuirass is then tightened underneath the armpits and upper abdomen by means of velcro straps.

mography. This is considered an indirect evidence of increased blood flow through these vessels. Further studies are now underway using flowmeters to accurately measure the increase in cardiac output, and in peripheral blood flow.

It has previously been demonstrated that, in emphysematous patients, after 30 minutes use of ETAB, the blood pH rises, and the $p\text{CO}_2$ falls.¹ Since most of these emphysema patients are acidotic or border-

line acidotic, it was decided to try ETAB as a form of treatment. The rationale was that with ETAB we could passively exercise the diaphragm, enhance the inspiratory and expiratory phases of respiration, increase the tidal volume and correct the acidosis. The cardiac output would be improved, and cor pulmonale possibly prevented.

Although there is considerable controversy over the etiology of pulmonary emphysema, the com-

bined Navy-U. C. Veterinarian School of Medicine Emphysema project at Davis, California³ leads one to suspect that one of the etiological factors in pulmonary emphysema is an interference with the nutritional blood supply to the lung—the bronchial artery. Because this is a systemic artery, an improvement in the systemic circulation should improve the nutrition of the lung. Similarly, an improvement in the pulmonary circulation would make more blood available for the exchange of oxygen and carbon dioxide. A concomitant improvement in the tidal volume would aid the interchange of gases at the alveoli-capillary level.

Studies were also carried on to determine the relative merits of cuirasses that encircled the entire chest and abdomen as compared to those encircling the lower chest and upper abdomen only. The earlier type cuirass, which encircled the neck and upper arms, was found to be unsatisfactory, since a number of the patients, who were already having respiratory difficulties, developed claustrophobia while in the cuirass. Similar cases of claustrophobia have been reported in patients using the older Drinker and Collins respirators.

The present model of Vital Capacitator which encircles the lower chest just below the armpits and upper abdomen, is considered eminently satisfactory due to its ease of application and comfort to the patient. It can be utilized with the patient standing, sitting or reclining. Its ease and rapidity of application is in marked contrast to previous models. It is a completely portable, self-contained unit, utilizing an ordinary 110 volt outlet for its power.

Several patients with moderately advanced emphysema have been treated with ETAB to date. These were patients who were not well controlled on the usual regime of medications for emphysema. This small series of patients were treated at intervals of three times weekly for 30 minutes at a time, using pressures of -15 cm H_2O inspiratory and $+15$ cm H_2O expiratory.

Evidence of subjective improvement in these patients was as follows:

1. Sense of well-being.
2. Feeling of "strengthening of the diaphragm".
3. Improvement in insomnia.
4. Ability to sleep without medication.
5. Ability to sleep without pillows.
6. Ability to take deeper inspiration and expiration.
7. Decrease in amount of medications taken.
8. Improvement in cyanosis of lips, fingers, and ears.
9. Decrease in edema of extremities.
10. Sensation of warmth in extremities.

These were all indications of subjective improvement volunteered by the patients themselves, without prompting by the physician.

Summary

We have used this external respirator on several emphysematous cases to date. The subjective improvement noted by these usually hopeless patients warrants continuing the use of ETAB as an adjunct to the classical methods of treatment of emphysema. Further studies are now underway to correlate the subjective improvement with objective findings, such as improvement in pulmonary function studies, blood pH and pCO_2 , and flowmeter studies to measure the increase in cardiac output. Densitometry studies combined with cinefluorography are being done to study the changes in the size and configuration of the heart during use of ETAB. Another use for ETAB may be in the field of peripheral vascular diseases, since there appears to be a beneficial effect on the entire cardiovascular system.

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FLEXIBLE PLASTIC BIOLOGICAL CABINET FOR TEMPORARY USE IN ISOLATION OF *MYCOBACTERIUM TUBERCULOSIS*

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The need for barrier systems to protect laboratory personnel while they are doing diagnostic or research work with infectious microorganisms has led to the development of the stainless steel ventilated safety cabinet. Wedum¹ stated that the best protection for the laboratory worker is to externalize him from his work. However, in many instances lack of space or funds, or the temporary nature of the project, prohibits buying the steel cabinet. In such cases a substitute is needed. Phillips² et al. described a suitable portable inexpensive collapsible plastic cabinet. This prototype cabinet has been used at Fort Detrick, Frederick, Md. since 1955 as a basic design for fabrication of many cabinets for specialized use, with a consequent saving of time and money. The versatility of the design allows cabinets for special projects to be built quickly and economically. This is exemplified by one such project that was handled recently for the U.S. Navy.

During a medical investigation of an outbreak of tuberculosis on a U.S. Naval vessel it was determined that a large number of laboratory samples would have to be processed on board. This would constitute a hazard to shipboard laboratory personnel unless the work could be done in a ventilated cabinet. The scheduled movements of the vessel and the short time available prevented design and purchase of a commercial cabinet suitable to the limited laboratory area. Naval authorities called upon Fort Detrick to supply a cabinet for the investigation.

The table space available in the sickbay aboard the ship was 25 inches wide by 24 inches deep. A projection 19 inches above this surface and projecting 13 inches over the surface further confined the size and shape of the cabinet.

To give adequate protection it was necessary to ventilate the cabinet with a minimum airflow of 50 linear feet per minute through each open glove port,³ and filter the exhaust air through 2 layers of 50 F.G. spun glass filter media.

Knowing the dimensions required for the cabinet and the problems encountered in air flow, it was decided to place the filter and blower on the top to provide maximum working space within the confined area under the 13 inch projection.

The cabinet was constructed of 20 mil (0.020") clear vinyl 24 inches wide, 23 inches deep and 18 inches high. Two glove ports were constructed in the front of the cabinet using two 6" Iris diaphragms. A pass-through port was constructed in the side of the cabinet 8" in diameter with a removable vinyl plastic cap to seal the port while cabinet was in use. The filter was attached to the aluminum filter housing at the top of the cabinet using a flange $\frac{3}{4}$ " wide with outside dimensions of 24" X 23". The filter was placed between 2 pieces of $\frac{1}{4}$ " hardware cloth 23" X 24" for support and to prevent the filter media from being pulled into the blower fan and motor. The $\frac{1}{6}$ H.P. motor used for the squirrel cage blower fan was placed on top of the cabinet filter housing with the back of the motor just 10 inches from the front of the cabinet. There was a $\frac{3}{4}$ " space between the filter media and the top of the filter housing to allow the exhaust air from the cabinet to pass through as much of the filter media surface as possible. The frame which gave the cabinet rigidity when in use, was constructed of $\frac{1}{2}$ " aluminum tubing. Three-way joints were used at all corners to make the cabinet collapsible when not in use. The

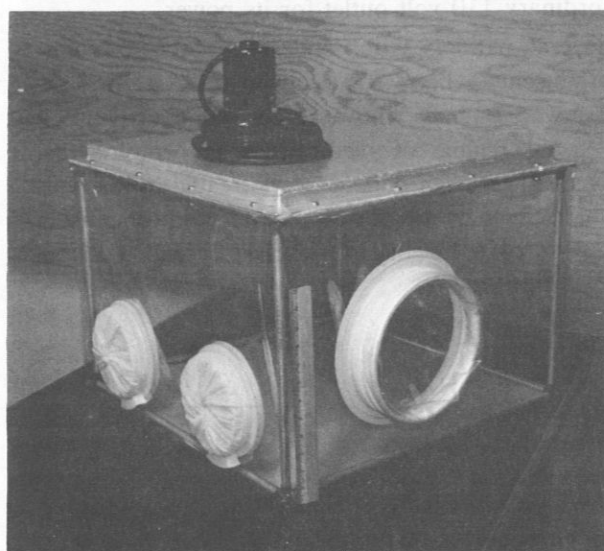


Figure 1

framing was placed inside the cabinet for rigidity and to prevent collapse when the blower was in operation. Total cost of materials was about \$29.00.

When completed (Fig. 1) the cabinet fulfilled its purpose. It was small enough to fit in the limited space provided for its use and the attached motor and blower exhausted the air through the cabinet at 50 linear feet per minute through each glove port. An 8" port on the side was useful for moving equipment and samples in and out of the cabinet. After each use the cabinet could be decontaminated, rapidly dismantled, and stored away for future use. It

allowed enough space for a technician to process specimens for the isolation of possible *Mycobacterium tuberculosis*, and at the same time protected him and the ship's company.

The Cabinet was delivered to the U.S. Naval Vessel just prior to departure for overseas duty.

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ANTIBIOTICS TODAY*

Selman A. Waksman, Professor Emeritus, Institute of Microbiology, Rutgers—
The State University, New Brunswick, N.J. *Bulletin of the New York
Academy of Medicine* 42(8): 623-632, August 1966.

Introduction

I am very grateful for the honor that you are conferring upon me on this occasion. The name of Rudolph Virchow brings forth in my mind some very exciting memories. A general impression still prevails in scientific circles that Virchow, the father of "cellular pathology," was a strong opponent of bacteriology. Such eminent bacteriologists as Klebs and Behring have attacked Virchow for his lack of appreciation of the progress made in such important fields as the causation and nature of diseases, e.g., of cholera, diphtheria, and tuberculosis. Virchow was not prepared to adjust himself immediately to the epoch-making discoveries of Pasteur. It was said that Virchow "grew up in the shadow of anticontagionism," which he outgrew later, however, as was demonstrated by his enthusiasm over Koch's work. His own later investigations in the fields of mycosis and parasitology, notably trichinosis, showed clearly his changing attitude. Virchow was particularly interested in the toxic substances produced by bacteria, as well as in the effects of purely chemical toxins or poisons on body cells. Nevertheless, he emphasized the fact that cellular pathology contributes to our understanding of the relation between drugs and the cells of the body. He now praised Pasteur's work as having "opened new avenues to medicine and technology," still insisting, however, upon the "social and constitutional factors" in the

causation of disease (Ackerknecht). In his *History of Pathology*, E. R. Long states: "We are all cellular pathologists today, taking our post-Virchowian cellular sense for granted."

The introduction of antibiotic and other chemotherapeutic agents in the treatment of infectious diseases may be said to help bridge the possible confusion in our understanding of the functions of the cell and of the invading microbe.

Historical

Seldom in the history of medical science has such rapid progress been made in the fundamental and practical aspects of the healing arts as during the past 25 years. This has been due in no small measure to the advances made in the knowledge and application of antibiotics.

It was known before 1940 that various groups of microbes are capable of producing chemical substances that have the capacity to exert an inhibiting effect upon the growth of other microbes and, actually, even to destroy them. During the period from 1938 to 1940, these potentialities became fully established. It was recognized that various saprophytic organisms are capable of inhibiting the growth of different disease-producing bacteria, fungi, and protozoa. The further discovery that such organisms are capable of forming new types of chemical compounds that possess desirable mechanisms for destroying disease-producing microbial agents has laid the basis for a new approach to chemotherapy. New drugs were placed at the disposal of

*The Rudolf Virchow Lecture of The Rudolf Virchow Medical Society in the City of New York, delivered at a meeting held at The New York Academy of Medicine, October 25, 1965. This lecture will appear also in the *Proceedings of the Rudolf Virchow Medical Society in the City of New York*.

the physician and the veterinarian for combating infectious diseases of man and animal. The nutritionist gained knowledge of a new type of compound that would increase the growth of domesticated animals. New agents became available for the preservation of our food supplies and other essential biological preparations, such as vaccines and viruses.

The formation of an antibiotic designated by Fleming in 1928 as penicillin was found in a culture of a fungus. In 1940 it was demonstrated that this compound could be used in the treatment of various infectious diseases caused by Gram-positive bacteria, cocci, and spirochetes. These diseases are now being treated quite successfully on a scale never dreamed of before. Another antibiotic, actinomycin, was isolated in 1940 from a culture of an actinomycete. It was highly effective against a number of bacteria. Unfortunately, it was too toxic for therapeutic use. Soon afterward (1943) another antibiotic, designated as streptomycin, was isolated from a culture belonging to the actinomycetes. It proved to be effective against infections caused by Gram-negative bacteria as well as Gram-positive organisms resistant to penicillin. It was also effective in the treatment of tuberculosis. Various other antibiotics were found to be produced by bacteria, notably the aerobic spore formers. It is sufficient to mention tyrothricin, isolated in 1939, later followed by bacitracin, polymyxin, and others. Some of these are also used effectively in the treatment of certain diseases caused by Gram-positive and Gram-negative bacteria. Thus the year 1940 may be said to have laid the foundation for the use of antibiotics in the treatment of infectious diseases.

A feverish search was now begun in numerous laboratories throughout the world, especially in the United States and in Great Britain, for other antibiotics that could be effective against diseases not previously amenable to therapy or that had become resistant to the known chemotherapeutic agents. In rapid succession came chloramphenicol, the tetracyclines, the neomycins, and erythromycins, followed later by numerous others.

Various diseases, beginning with those caused by the so-called "larger viruses," or the lymphogranuloma-psittacosis group of intracellular parasites, trichomonal, amoebic, and other protozoan infections, and numerous others caused by bacteria and fungi could now be treated successfully by means of drugs produced by microbes, namely the antibiotics.

The microbiologist was now successful in obtaining more efficient strains of antibiotic-reducing organisms, of improving culture media, thus increas-

ing the yields of the antibiotics, and of developing new techniques for their isolation. The chemist succeeded in making new derivatives of natural antibiotics, such as dihydrostreptomycin, the tetracyclines, and certain others that were less toxic or more effective. Numerous synthetic compounds soon made their appearance, thereby supplementing the antibiotics in the treatment of infectious diseases. The pharmacologist succeeded in improving the efficiency of the drugs and reducing their toxicity. The clinician has made use of this accumulated knowledge to eliminate the danger from infectious diseases and help increase the life span of man.

Production of Antibiotics

From being a mere curiosity a quarter of a century ago, the antibiotics have come to occupy an important place in human, in animal and, to some extent, in plant therapy. Several thousand chemical compounds or preparations have now been isolated from numerous cultures of microorganisms. Of these, about 80 have found practical application in disease control. Among the antibiotic-producing organisms the actinomycetes have come to occupy an important place as producers of antibiotically active substances. More than 500 preparations have been obtained from this group of organisms, especially from members of the genus *Streptomyces*. Of these, about 50 have found practical applications (Waksman and Lechevalier).

Most antibiotics are not formed by the various microorganisms as single chemical entities, but as groups of closely related chemical compounds. Different species may produce slightly different modifications of the same type of compounds. Thus the neomycin complex is made up not only of two closely related forms (neomycins B and C), but also of the neamine, catenulin (paromomycin), kanamycin, and a variety of others. Neomycin itself can be formed by different species of *Streptomyces*. Various actinomycetes are capable of forming several other basic antibiotics in a number of different modifications, as in the case of the streptothricins. Each antibiotic preparation may consist of several chemical modifications of the same compound, which are also characterized by different biological properties.

The same thing is true of the tetracyclines, the erythromycins, the polyenes, and various other antibiotics. Variations in structure and in activity have presented numerous puzzling problems to the microbiologist, the chemist, the pharmacologist, and the clinician. In the case of the tetracyclines, we find not only the chlor- and oxy-compounds, but also

tetracycline itself, as well as demethyl-tetracycline and a host of other derivatives. The macrolides represent a large number of substances, varying in chemical structure and biological activity. This is even more true of the polyenes, especially the tetraenes, the hexaenes, and the heptaenes, all of which are characterized by strong antifungal and limited antibacterial properties; they vary greatly in toxicity and in nature of the antifungal spectra.

Recognition of the potential antitumor properties of the actinomycins has greatly stimulated studies of this group of antibiotics. Almost all the capital letters of the alphabet have been used to designate the different forms that have been isolated all over the world from different cultures of *Streptomyces*. Roman numerals and Greek letters have been added to supplement this system of designating the more than 50 actinomycin preparations now known. By feeding the actinomycin-producing cultures different amino acids and by developing new methods for the isolation and separation of the individual chemical entities, much has been learned in the elucidation of this group of compounds. All the actinomycins now known are characterized by a high toxicity, considerable activity against Gram-positive bacteria, and some degree of potency against certain neoplasms.

The chemical differences among the various antibiotics are always accompanied by corresponding differences in their biological properties, especially toxicity and antimicrobial activity or antibiotic spectrum. These properties are of great importance in determining the practical utilization of the particular antibiotic preparations in the treatment of specific diseases.

The screening programs for new antibiotics are still proceeding at an unending pace. Particular attention is now being paid to substances that might prove effective against tumors and the true viruses. The new preparations are being constantly isolated and tested for their effectiveness in experimental animals, in tissue cultures, in egg embryos, and by a variety of other procedures. A number of antitumor preparations have been isolated, including, in addition to actinomycin, also azaserine, sarcosine, carzinophilin, mitomycin, olivomycin, and pectamycin. They are all highly toxic and possess only limited practical application.

Certain antibiotics can be modified chemically to yield products with more desirable or at least somewhat different properties. Of particular interest is the recent introduction of the so-called "semisynthetic" penicillins, or those penicillins that have been modified in chemical structure and in biological

effectiveness by the use of enzyme systems and by chemical synthesis. Streptomycin can be reduced to dihydrostreptomycin, and chlortetracycline to tetracycline; chemical modifications of the inactive part of the chloramphenicol molecule to render it active are other illustrations.

The Problem of Resistance

Among the more important problems in the field of antibiotics now receiving considerable attention are those concerned with the phenomena of resistance. The practice of combining two or more antibiotics, or an antibiotic with a synthetic compound has undergone much criticism. Such combinations have worked well in the treatment of tuberculosis, as by combining of streptomycin with PAS or with isoniazid. The nature and concentration of these combinations are usually modified in the treatment of particular cases, depending on the nature and state of the disease. Cases of tuberculosis that have become resistant to these three drugs are now treated with viomycin or cycloserine, alone or together with ethionamide or other synthetic or antibiotic compounds.

Considerable success has also been experienced in the use of two antibiotics, such as penicillin and streptomycin, or of an antibiotic, such as neomycin, with a steroid. The possible danger of development of resistance to both antibiotics at the same time suggested the elimination of such a practice. The development of resistance to penicillin among the staphylococci has become a very serious problem. Several new antibiotics, beginning with erythromycin, novobiocin, and vancomycin, followed by others, tend to replace older drugs whenever resistance has developed. The synthetic or rather semisynthetic approach to the modification of the antibiotic molecule has been particularly successful in the case of penicillin, rendering it more resistant to the action of penicillinase or more active upon bacteria that have tended to develop resistance to the natural penicillins.

Antitumor Substances

Numerous preparations have now been isolated that possess remarkable activity against certain neoplasms. Unfortunately, only a few of them have found a certain place in the treatment of this group of diseases. Actinomycin was the first antibiotic to have shown such limited potentialities. This antibiotic and some others isolated more recently are too toxic or are not sufficiently active. They are not very promising, as compared to the treatment of

infectious diseases by antibiotics. These compounds vary greatly in their chemical nature and in their biological activity. Some are active against neoplasms and bacteria, others against neoplasms and fungi, and still others against neoplasms alone. The neoplasms vary greatly in their sensitivity to different agents; just as, in the case of bacterial or fungal sensitivity to various antibiotics, an antitumor spectrum can be observed.

Antiviral Substances

Even less progress has been made thus far in the search for antiviral agents. In spite of the fact that we now possess numerous compounds that are active against virtually all saprophytic and pathogenic bacteria, fungi, and protozoa, none of them is known to be active upon the small or true viruses. The excitement created by the isolation of the "broad spectrum" antibiotics, with the possibility of their action upon viruses, soon abated when it was discovered that their activity embraced only the so-called "large viruses," or the intracellular parasites of the lymphogranuloma-psittacosis group. The small viruses are not living systems, in a proper sense; they do not grow, do not metabolize, and do not multiply. They are inductors of reactions, thus endowing the host cells with a change in their metabolic processes from "normal" to "abnormal," thereby causing them to form more viruses of the same kind rather than carry out normal metabolic and growth reactions. A logical approach to the control of the viruses must be quite different from that utilized in the isolation of antibiotics.

Among the recently isolated antiviral agents, mention may be made of the following: mutomycin, myxoviomycin, nitromycins, quinomycin (this was said to have a prophylactic effect for poliomyelitis in mice), rutilantin (shown to possess antiphage activity), and violarin B.

Antibiotics in Clinical Medicine

Antibiotics continue to occupy an important, if not a leading, place in the practice of medicine. This is true particularly of the treatment of infectious diseases caused by bacteria and other microorganisms. Only a few recent contributions may be cited:

The sensitivities of 621 strains of Gram-negative bacteria isolated from patients with clinical infections brought out the fact (Petersdorf et al.) that chloramphenicol was the most effective agent against *Escherichia coli*; neomycin and kanamycin against *Klebsiella*; polymyxin B against *Pseudomo-*

nas; and penicillin against *Proteus mirabilis*. The extensive use of antibiotics against gonococci led to progressive decrease of sensitivity of the organisms to penicillin and streptomycin. Out of 327 strains studied (Roiron et al.), 72.4 percent were sensitive to 50 μ g/ml of streptomycin, recovery being obtained in 73.14 percent of the cases; 22.9 percent of the strains were resistant to a concentration of 1,000 μ g/ml streptomycin, and recovery was observed in 6.1 percent of the cases only. Strains resistant to streptomycin were less sensitive to penicillin than nonresistant strains. All strains were sensitive to tetracycline and to spiramycin.

Today's Problems

Numerous problems in the field of antibiotics still remain either unsolved or insufficiently understood. They are of both theoretical and practical significance. Some of them may be listed here:

The actual role of the antibiotics in the life of the organisms producing them is nuclear.

Since antibiotics are formed largely by soil-inhabiting microorganisms, the question whether they play any role in the ecological relationships of these organisms often arises.

The mechanism of development of resistance by some bacteria and not by others still leaves much to be elucidated. The same is true of the rates of development of resistance against different antibiotics.

The formation of bacterial strains that become nutritionally dependent upon certain antibiotics, as in the case of streptomycin, has aroused much speculation but still remains largely unexplained.

The mode of action of antibiotics upon different bacteria is now receiving considerable attention.

Whatever the final answer to these and other questions will be, we may well conclude that the antibiotics have made and will no doubt continue to make important contributions of great theoretical and practical significance to our understanding of certain natural processes, to provide tools for the solution of fundamental biological problems and, most important, to the alleviation and control of the numerous infectious diseases of man, animals, and plants. The future is rich in potentialities. It is bound not only to supplement but to increase greatly our store of knowledge of a highly important group of chemical substances produced by microbes, to broaden the armamentarium of the medical profession, and to contribute towards an increase of our food supply.

Summary

It is just a quarter of a century since the antibiotics became recognized as an important group of chemical compounds produced by microorganisms, and their practical applications in the control of numerous infectious diseases established. The isolation of gramicidin from a culture of a soil bacillus, the reinvestigation of the production of penicillin by a culture of fungus, and the isolation of actinomycin from an actinomycete, marked the beginning of a new era in medical science and in veterinary practice that came to be designated as the era of antibiotics. In this brief period of time the treatment of infectious diseases of man, animals, and plants caused by bacteria, fungi, and other microscopic forms of life has been revolutionized. Antibiotics have also contributed in many other ways toward the improvement of man's health, the supply of available food, the preservation of various foodstuffs and various other biological products.

However, as in the case of other great discoveries, the extensive use of antibiotics, resulting in the

elimination of many infectious diseases and in a marked increase in the life span of man, has brought with it new problems, some clinical and others social in nature. The development of resistance among sensitive organisms to known antibiotics has led to the search for new substances produced either biologically or synthetically, and to the use of combinations of antibiotics and synthetic compounds. Important diseases, notably those caused by viruses as well as those of unknown etiology, still remain largely resistant to chemotherapy. Numerous efforts are being directed toward the discovery of compounds that would do for these diseases what antibiotics have done for diseases caused by bacteria and other microorganisms.

New antibiotics are being constantly isolated. Some of these have proved to be highly promising in increasing the armamentarium of the medical profession for combating diseases that have afflicted mankind since time immemorial.

(The references may be seen in the original article.)

STRESS ULCER: ETIOLOGY, DIAGNOSIS AND TREATMENT

Frank P. Brooks MD FACP*, *Med Clin N Amer* 50(5): 1447-1455,
September 1966.

The term "stress ulcer" has been applied to such a variety of clinical syndromes and pathological lesions that some believe it should be abandoned. We reserve the term for *acute ulcers* of the upper gastrointestinal tract which develop in patients exposed to stress. By definition this excludes "gastromalacia," and hemorrhagic gastritis and erosions not penetrating the muscularis mucosae even though these lesions may be etiologically related. It has the advantage of including acute ulcers developing in patients with previous ulceration as well as those appearing for the first time. It should remind the clinician that life-threatening ulcers may develop in patients under stressful circumstances.

Incidence

The actual incidence of stress ulcers is unknown because of the difficulty in diagnosing the lesion and the rapidity with which it heals. Studies at autopsy have usually been done in retrospect and may therefore vary with the interest of the prosector. However, they are probably the most reliable evidence available. Table 1 shows the results of three such studies. Note that incidence of acute ulcers is six times greater in the Cleveland series. However there were 42 patients with esophageal ulcers in this group. In both, the number of acute ulcers exceeded the number of chronic ulcers.

Somewhat more reliable data may be available in patients dying of specific causes. Thus Hummel et al found 17 acute ulcers among 80 patients with burns dying at the Brooke Army Hospital. At the Mayo Clinic, Spencer et al found acute erosions or

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Table 1. *Incidence of Gastroduodenal Ulcers at Autopsy*

Hospital	No. Con- secutive Autopsies	No. Patients with Acute Ulcers	No. Patients with Chronic Ulcers
Seattle, Wash.	4102	42	
Cleveland, Ohio	943	62	31
Norway and Denmark	4317	208	177

ulcers in 30 percent of 274 patients with intracranial tumors but only 13 percent of controls. McDonnell and McCloskey at Jefferson Medical College Hospital reported five acute ulcers among 179 patients dying with intracranial disease as a factor in the cause of death and eight among 243 patients dying within two months of operation outside the central nervous system. Among 1,750 consecutive autopsies at the same institution Herbut collected five examples of acute peptic ulcers following operations on other than the upper gastrointestinal tract. Mears found acute ulcers in eight patients among 375 dying with fractures of the long bones. There were two patients with inactive chronic peptic ulcers in the same group. Watson and Netsky reported six patients with a variety of neurological diseases who had acute ulcers at autopsy.

The incidence of ulcers detected clinically is even more variable. Davis, Wetzel and Davis reviewed the operative and clinical records of 700 patients seen over a 30-year period. They found 48 examples of acute upper gastrointestinal hemorrhage or ulceration during the postneurosurgical period (0.7 percent). Eight of the 48 patients had a history of gastrointestinal symptoms, four had roentgenographically demonstrated ulcers prior to operation. Autopsies were performed on 24 of the 30 patients who died. Acute ulcers were present in nine, five had erosions and one had esophageal varices.

Moncrief, Switzer and Teplitz found an increasing incidence of acute ulcers in burned patients, rising from 6.5 percent in 1954 to 21.3 percent in 1962. Schaberg, Hildes and Alcock reported that 34 of 480 patients with bulbar poliomyelitis had gastrointestinal bleeding.

Drye, Schoen and Ross stated that 42 patients with duodenal ulcer had other than gastric surgery at the Louisville General Hospital from 1945-1949 and three had a definite activation of their ulcers.

In summary, the incidence of acute ulcers of the upper gastrointestinal tract in consecutive autopsies ranges from 1 to 6 percent. In patients with intracranial tumors the incidence may be twice that in

control series. Patients with burns of a large area of body surface also have a high incidence of such lesions. Clinically, neurosurgical operations, burns and poliomyelitis are associated with acute upper gastrointestinal bleeding, most of which is due to acute ulcers. However, about 1 percent of patients with duodenal ulcer may be expected to have an activation of their ulcer following the stress of operation.

Clinical Characteristics

By far the most dramatic aspect of these ulcers is massive upper gastrointestinal bleeding. Levrat, Pasquier and Lambert estimate that about 80 percent of patients present in this way. Another 15 percent develop perforation of an ulcer. Table 2 lists some of the characteristics of stress ulcers. Unfortunately since our knowledge of the incidence is inadequate, the description of the clinical syndrome is incomplete. Almost certainly similar pathologic lesions may occur and heal without patient or physician being aware of it. Activation of a chronic duodenal ulcer may also lead to a sudden gastrointestinal hemorrhage with or without a previous history of ulcer. In such patients the lesion is indistinguishable from the ordinary peptic ulcer and the patient's gastric secretory pattern is that of other gastric or duodenal ulcer patients. We can only suspect on the basis of meager facts that this is rarely the case in the patient presenting as a stress ulcer.

Illustrative Case Histories

A 67 year old white man was admitted to the Hospital of the University of Pennsylvania on November 28, 1965. For eight months he had been under treatment for oliguric renal failure with multiple hemodialyses. He had mitral stenosis and auricular fibrillation and a past history of a cerebrovascular accident but no history of ulcer disease. On the day of admission he passed a tarry stool. His hemoglobin had been 11.7 gm/100 ml. and fell to 7.4 gm. His blood urea nitrogen on admission was 81 mg./100 ml. but fell to 27 on repeated dialyses. He

Table 2. *Clinical Characteristics of Stress Ulcers*

1. Age; extremes of life included
2. Sex; males and females represented equally
3. Previous gastrointestinal symptoms often absent
4. Sudden onset of hematemesis, melena or perforation
5. Pain uncommon
6. Equal incidence of gastric and duodenal ulcers
7. Multiple ulcers common
8. Lack of evidence for gastric acid hypersecretion
9. Temporal relation to stress; usually within a week
10. X-ray evidence of ulcer often absent
11. Mortality of 50 percent or greater
12. Rapid healing if patient survives
13. Surgery may be necessary for perforation or uncontrolled bleeding

was found to have pneumonia involving the right middle lobe. He continued to have tarry stools intermittently until December 5. He was given repeated transfusions. On December 12 he vomited blood. He died on December 26, 1965. At necropsy he was found to have 2 acute duodenal ulcers without other lesions of his gastrointestinal tract.

A 39 year old Negro woman was admitted to the Hospital of the University of Pennsylvania on June 19, 1965 with abdominal pain of 2 weeks' duration. The initial diagnosis was acute pancreatitis but on July 3, 1965, laparotomy disclosed a necrotic area in the ileum secondary to intestinal obstruction due to adhesions following a previous laparotomy. The necrotic bowel was resected and an ileocolostomy performed. For a week she improved but on July 14 blood was noted to be draining from a nasogastric tube and her hemoglobin was found to be 5.7 gm./100 ml. She was treated with transfusions and gastric cooling. On July 17 she bled again, and again responded to cooling. Later on the same day she developed a high fever and was found to have a gram-negative septicemia with an organism resistant to all antibiotics to which it was tested. She died on July 22. At necropsy, she had 4 ulcers in the esophagus and 6 in the body of the stomach. The largest of the latter measured 3 cm. in diameter. One was covered with a blood clot.

These two patients represent examples of acute ulcers developing in patients with serious illnesses and contributing to their demise. In neither do we have evidence of specific dysfunction of the central nervous system or the endocrine glands leading to the development of the ulcers. Both patients therefore fall into the general category of stress ulcers.

Etiology

Table 3 lists various diseases and stressful events associated with acute ulcers. In general they are thought to act by (1) increasing acid secretion, (2) diminishing the normal protective devices, i.e., mucus and surface epithelial repair, (3) reducing blood supply by opening arteriovenous shunts or occlusion with thrombi. The common pathway to such mechanisms is usually thought to be the autonomic nervous system and the endocrine glands particularly the adrenals.

Experimental evidence for hypersecretion of acid pepsin during stress is lacking. Burns in dogs with vagally denervated gastric pouches depressed gastric acid output. Brodie found that restraint had no effect on acid output in rats with chronic gastric fistulas.

Attempts to stimulate gastric acid secretion through electrodes or lesions in the brain have been more successful. Leonard et al have reported increased acid output in fasting cats upon stimulation of chronically implanted electrodes in the hypothalamus, but not in dogs.

Pearl and her associates recently claimed an increase in the number of parietal cells in the stomach of cats with stimulation of the anterior hypothalamus for 48 hours or more. Leonard and others from the same laboratory found a decrease in total gastric blood flow following posterior hypothalamus stimulation in anesthetized dogs. At the same time gastric acid output after histamine was markedly reduced.

In our laboratory we have been able to demonstrate that bilateral destruction of the ventromedial

Table 3. *Lesions Associated with Acute Gastroduodenal Ulcers*
(Modified after Levrat et al)

-
- I. Lesions of the Central Nervous System
 - A. Intracranial tumors
 - B. Cerebrovascular accidents
 - C. Intracranial trauma
 - D. Bulbar poliomyelitis
 - E. Miscellaneous diseases of the nervous system, encephalopathies etc.
 - II. Surgical Procedures
 - A. Cardiovascular surgery
 - B. Genitourinary surgery
 - C. Abdominal surgery
 - D. Miscellaneous surgical procedures
 - III. Fractures
 - IV. Burns and Cold Injury
 - V. Hypoxia
 - A. Respiratory insufficiency
 - B. Cor pulmonale
 - C. Hypoxia with anesthetics
 - D. Pneumothorax
 - E. Acute laryngotracheitis
 - F. Bronchogenic carcinoma
 - VI. Intoxications and Metabolic Derangements
 - A. Uremia, diabetic coma
 - B. Barbiturate intoxication
 - VII. Miscellaneous Factors
 - A. Medication: aspirin, corticoids, reserpine
 - B. "Psychic" factors
 - C. Indwelling gastric tubes
 - D. Infection—septicemia
 - E. Shock
 - F. Dehydration
 - G. Fat emboli
-

nuclei of the hypothalamus in rats was followed by hyperphagia as judged by an excessive rate of weight gain and an increase in acid pepsin secretion during the interdigestive period from chronic gastric fistulas. Only those rats which became hyperphagic exhibited the hypersecretion.

Clinical studies designed to show that patients with stress ulcers have gastric acid hypersecretion have been inconclusive or negative. Hirschowitz et al found that one of their student subjects receiving corticotropin developed hemorrhage from a duodenal ulcer while on the drug. His basal acid secretion was low normal before and on the day of onset of symptoms. Davis studied gastric acid secretion in patients before and after craniotomy and found a fall in acid concentration postoperatively in ten pa-

tients. One of these experienced a hemorrhage from the upper gastrointestinal tract.

Patients with duodenal ulcer may represent a different secretory response. Dragstedt et al found that acid output during 12 hours of night secretion increased on the night before gastric surgery compared to previous nights in 18 patients. Drye, Schoen and Schuster found that during the second 12 hours after surgery, patients with duodenal ulcer had acid concentrations in the same range as those before operation indicating exposure to potentially ulcerogenic secretion.

Stress ulcers are often compared to those occurring in patients receiving corticosteroids. The difficulty in demonstrating that steroids produce gastric acid hypersecretion in man or experimental animals

is well known. Menguy and Masters found that corticosteroids given to dogs with pouches of the pyloric portion of the stomach decreased the secretion of gastric mucus.

In summary, stressful stimuli have not been shown to increase gastric acid secretion to a degree that hypersecretion becomes a likely explanation for the formation of stress ulcers. In the case of duodenal ulcer patients, however, hypersecretion may be a significant factor in the activation on chronic duodenal ulcer which occurs under stress.

If stress ulcers occur as a result of a decrease in local resistance secondary to a decreased secretion of mucus and a reduction of mucosal blood supply, to what extent is this mediated through the central nervous system? Experimental models of stress ulcers have been developed which employ restraint of movement, avoidance conditioning and lesions or stimulation of the central nervous system. The behaviorally induced ulcers in rats have been quite reproducible and already have suggested clinical studies to search for counterparts of the strain and personality type variations in susceptibility to ulcerations found in the rats. The only published attempt to reproduce the famous "executive monkey" induced ulcers was a failure. To summarize, ulcers resembling stress ulcers in man can be produced in animals by experimental techniques involving stressful behavior. There are differences in susceptibility related to the genetic strain and behavioral characteristics of the animals. The neurophysiologic basis of the production of ulcers remains unknown.

Diagnosis

Hematemesis and melena should lead to gastric intubation to demonstrate an upper gastrointestinal source of the bleeding, while perforation is eventually associated with usual signs of muscle rigidity and tenderness. Since the patients are frequently desperately ill from associated disease, it is a matter of clinical judgment to decide to what extent the usual methods of study such as barium meal or esophagogastrosocopy should be employed. We have followed the rule that if the patient is in condition for surgery to be considered as a method of treatment, then a vigorous diagnostic program including the above procedures is warranted. In our hospital a representative from the patient's floor is asked to remain with the patient during his trip to the X-ray Department, while endoscopy is done in the Gastrointestinal Unit as an emergency procedure. Gastroscopy offers the best opportunity to demonstrate

acute gastric ulcers, while fluoroscopy and radiography may show the presence of a duodenal ulcer. Air beneath the diaphragm on an erect or decubitus film is helpful in the diagnosis of perforation.

Treatment

In the presence of gastric bleeding a No. 30 F. gastric tube should be passed and the stomach irrigated with 2 quarts of iced liquid with a syringe with a large nozzle. In some patients with cerebral edema, ice water rather than iced saline may be preferable. If the bleeding abates, an ounce of antacid such as aluminum hydroxide with or without magnesium oxide may be injected hourly. After several hours this may be alternated with 2 ounces of milk. Some authors have advocated the administration of anticholinergic drugs to reduce acid secretion. This practice is questioned by others because of the effect of muscle relaxation on bleeding vessels. We have used propantheline 15 mg. q.i.d. intramuscularly in selected patients with evidence of acid secretion which might delay healing. Blood transfusions must be given to maintain the patient's blood pressure and pulse as well as hemoglobin concentration or hematocrit.

If, after 24 hours, blood is still necessary in quantities of over 3 units per 24 hours, a decision should be made on the possibility of surgical exploration for possible gastrectomy. The possibility of bleeding from an activated chronic duodenal ulcer rather than a diffuse gastritis makes this essential. If the decision is that the patient is too ill to withstand surgery then gastric cooling should be undertaken by persons experienced in this technique.

The mortality in stress ulcer is considerable. Five of the ten patients reported by Lillehei et al died. Four of Griffin's seven patients died, but three recovered with medical treatment. Probably the most important factors in survival are early recognition, accurate diagnosis when possible, and readily available medical and surgical consultation by physicians familiar with this entity.

Acknowledgments

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(The references may be seen in the original article.)

HISTORY OF THE NUMBERING OF THE CRANIAL NERVES

C. Wilbur Rucker MD, Section of Ophthalmology, Mayo Clin
Proc 41(7): 453-461, July 1966.

The present-day classification of the cranial nerves into 12 named and numbered pairs has been generally accepted for about a century. For the benefit of those readers whose recollection of it is hazy, it is reproduced in Table 1. Many of today's physicians, during their first year in medical school, memorized the names of the nerves with the aid of the old doggerel:

On old Olympus' towering tops

A fat armed German viewed some hops.

The practice of designating the cranial nerves as numbered pairs dates back to the beginning of the Christian era—certainly to its second century and possibly earlier. The earliest classification extant is that of Galen, who himself found it faulty; but nevertheless, it remained unchallenged for 1500 years. Few of the classifications proposed over past centuries have been regarded as really satisfactory, even by their own authors.

Table 1
Cranial Nerves: Current Numbers and Names

I	Olfactory	VII	Facial
II	Optic	VIII	Acoustic
III	Oculomotor	IX	Glossopharyngeal
IV	Trochlear	X	Vagus
V	Trigeminal	XI	Spinal accessory
VI	Abducent	XII	Hypoglossal

Galen (circa A.D. 130-201) was a Greek physician who practiced in Rome. After study at Pergamum, Smyrna, Corinth, and Alexandria he served 4 years as physician to the gladiators in his home city of Pergamum and then went to Rome about A.D. 161, the beginning of the reign of the emperor Marcus Aurelius. He spent much time in study and travel and is said to have written hundreds of treatises. His influence on the practice of medicine extended well into the Renaissance.

Galen described the cranial nerves as seven pairs. That this classification was not original with him is suggested by his remark that he did not differ from Marinus in his account of these nerves. Marinus of Tyre practiced in Alexandria, at the mouth of the Nile, about A.D. 100. Since his writings have not

been preserved, his precise statements are uncertain. The school at Alexandria, established soon after the founding of that city by Alexander the Great in 331 B.C., was one of the most important of the ancient world.

Galen did not include the olfactory nerves in his classification. He had observed that they extended into the nasal cavities, but regarded them as elongated outgrowths of the brain. His first pair comprised the optic nerves, and his second pair the oculomotors, which in his opinion went to all of the eye muscles. His seven pairs of cranial nerves did not include the trochlear or the abducens, which he seems to have overlooked. Any drawings he may have left have been lost. The current names of his numbered pairs are listed in Table 2.

Andreas Vesalius of Brussels (1514-1564) followed Galen in dividing the cranial nerves into seven pairs (Table 3). In the illustrations of the base of the brain (Fig. 1, not shown) and of the cranial cavity from the first edition of his *De Humani Corporis Fabrica* of 1543, he showed the nerves known currently as the oculomotor, trochlear, and abducens. Like Galen, Vesalius believed that the second pair, the common oculomotor, went to all the eye muscles. He showed the slender thread now called the trochlear as being distributed with peripheral branches of the ophthalmic division of the trigeminal, and the abducens as being distributed to the temporal muscle and buccal cavity.

Table 2
Cranial Nerves: Classification by Galen, Circa A.D. 170 (After Duckworth²), With Current Names

I	Optic
II	Oculomotor
III	Trigeminal
IV	Motor root of trigeminal
V	Facial and auditory
VI	Glossopharyngeal, vagus, accessory
VII	Hypoglossal

Vesalius, too, seems to have been dissatisfied with the classification of the cranial nerves. In his *Fabrica* he failed to include the olfactory with the cranial

nerves and considered the optic nerves to be the first pair. Yet at his public anatomic dissections he spoke of the nerves of smell as the first pair and the optic nerves as the second pair.

The discovery of the nerve known currently as the fourth or trochlear is credited to Alessandro Achilini (1463-1512) of Bologna. Its relation to the trochlear muscle was discovered by another Italian, Gabriele Falloppio (1523-1562).

The French physician Jean Riolan (1577-1657), in his *Anatomia seu Anthropographia* published during the years 1618-1626, stated that the abducent nerve terminated exclusively in the abducent muscle.

Table 3

Cranial Nerves: Classification by Vesalius, 1543,* With Current Names

I	Optic
II	Oculomotor
III	Trochlear and sensory root of trigeminal
IV	Motor root of trigeminal
V	Facial, acoustic, abducent
VI	Glossopharyngeal, vagus, accessory
VII	Hypoglossal

* Slightly modified from Saunders and O'Malley.

Thomas Willis (1621-1675), a London physician, classified the cranial nerves into eight pairs in 1664. His illustration of the base of the brain is shown in Fig. 2, not shown. According to the English translation (1681) of the original Latin (Table 4) the first pair are the "smelling nerves," the second pair the "seeing nerves," and the third pair the "moving nerves of the eyes." The fourth are "bestowed wholly on the trochlear muscle," the fifth "serves for sense and motion of the face," and the sixth is "inserted into the Muscle drawing back the Eye planted in its outward angle." For these first six pairs he established a method of numbering that is still employed. His other numbers have undergone change since his day. His seventh pair "is employed about the sense of hearing" and "is bestowed upon the muscles of the tongue and face," while his eighth and last-numbered pair, the wandering nerve, "reaches forth its branchings through the whole cavity of the middle and lower belly and to most of the Bowels in either." He also described the sympathetic nerves (which he called the "intercostal nerves") and the nerve to the diaphragm, and presented the first description of the "spinal nerve, an accessory of the Wandering Pair."

Raymond Vieussens (1641-1716), professor of anatomy at Montpellier in southern France, published in his *Nevrographia Universalis* of 1685 a description of the brain and nerves including a list of the cranial nerves. He adopted Willis's classification, adding to it a ninth pair distributed to various muscles in the front of the neck and to the muscles of the tongue and also serving taste, and a tenth pair distributed to muscles in the back of the neck. His illustrations (Fig. 3, not shown) were more precise than those of Willis.

During the eighteenth century, little changed; and the entire grouping beyond the sixth pair remained

Table 4

Cranial Nerves: Classification by Willis, 1664*

I	Smelling nerves
II	Seeing nerves
III	Moving nerves of eyes
IV	Pathetick
V	Sense and motion of face
VI	To muscle at outward angle of eye
VII	For hearing and to muscles of face and tongue
VIII	Wandering pair

* From the English translation of 1681.

confused until well into the nineteenth century. The confusion might have been less had more writers read a thesis published by Soemmerring in 1778 in which he numbered 12 pairs of cranial nerves approximately as they are known today (Fig. 4, not shown).

Samuel Thomas Soemmerring (1755-1830; pictured in Figure 5, not shown), was a 23-year-old student at Göttingen, Germany, when his thesis for a doctorate in medicine was published, listing eight nerves of the encephalon and four nerves of the medulla spinalis that exit through openings at the base of the cranium (Table 5).

A glance at Soemmerring's life as a medical student may be appropriate at this point. Soemmerring's father was city physician of Thorn, in Prussia. Numerous written communications with his father during the years at Göttingen present a vivid picture of the son's pleasures and hardships as a medical student. The small amount of money furnished by his too frugal father elicited the following letter: "I deny myself much, and eat no butter, which all other people in Göttingen eat. For supper I eat nothing but dry bread and drink no coffee for breakfast. On rare occasions for dessert at night I eat a piece of

Table 5

Cranial Nerves: Classification by Wistar, 1817

Nerves of encephalon having egress through cranium

- | | |
|-----------------------|------------------------------|
| 1. Nervus olfactorius | 5. Par trigeminum |
| 2. Nervus opticus | 6. Par abducens |
| 3. Par tertium | 7. Nervus communicans faciei |
| 4. Par quartum | 8. Nervus auditorius |

Nerves of medulla spinalis having egress through cranium

1. Nervus glossopharyngeus
2. Par vagum
3. Par hypoglossum
4. Nervus accessorius

dry plum kuchen. Since one does not wear cuffs every day I save a little on laundry money."

During the next several decades various other classifications were proposed, but Soemmerring's finally prevailed and with minor modifications has been in general use from about the middle of the nineteenth century to the present. Apparently his thesis did not come to the attention of anatomists in America, England, or France during the early portion of the nineteenth century. Among the several writers who could have benefited from it was Caspar Wistar (1761-1818) of Philadelphia, the first professor of anatomy at the University of Pennsylvania and the author of the first American text on surgery. In his *System of Anatomy* he published a list of nine pairs of cranial nerves, as shown in Table 6. Notable is his indiscriminate use of Latin and English together. His only contribution to the classification of Willis is that he identified a branch that was distributed solely to the muscles of the tongue; yet Galen had done that many centuries before him.

Similar classifications appeared in texts by Sir Charles Bell of London (1827) and Jean Cruveilhier of Paris (1844).

The classification employed at present combines some individual nerves—the trigeminal with the masticator, for example, and the cochlear with the vestibular. Olof Larsell, formerly professor of anat-

Table 6

Cranial Nerves: Classification by Wistar, 1817

- | | |
|------|----------------------|
| I | Olfactory |
| II | Optic |
| III | Motores oculorum |
| IV | Pathetic |
| V | Trigemina |
| V' | Motores externi |
| VII | Auditory and facial |
| VIII | Par vagum |
| IX | To muscles of tongue |

omy at the University of Oregon, sought to improve the situation in his text, *Anatomy of the Nervous System*, in 1942. After listing the standard 12 pairs he proposed an alternative list of 16 pairs (Table 7) "on the basis of comparative anatomy and the more detailed knowledge of their connections." However, after further consideration of the matter, he deleted it from the next edition of his text in 1951, returning to the simpler classification of 12 pairs.

So the present classification of the cranial nerves into 12 numbered pairs was devised by a German medical student nearly two centuries ago. Its basis is the holes in the floor of the skull through which nerves extend out from the cranial cavity to organs as diverse as the eyes and the bowels. Only in part does it sort the nerves according to their function or ultimate distribution. Although rather arbitrary and awkward, it seems likely to be with us for some time.

Table 7

Cranial Nerves: Classification by Larsell, 1942

- | | |
|---------------|----------------------|
| 1. Terminal | 9. Facial |
| 2. Olfactory | 10. Glossopalatine |
| 3. Optic | 11. Cochlear |
| 4. Oculomotor | 12. Vestibular |
| 5. Trochlear | 13. Glossopharyngeal |
| 6. Abducent | 14. Vagus |
| 7. Trigeminal | 15. Hypoglossal |
| 8. Masticator | 16. Spinal accessory |

(The references and figures may be seen in the original article.)

MEDICAL ABSTRACTS

COMPARISON OF PHYSIOLOGICAL CHANGES DURING LONG TERM IMMERSION TO THE NECK LEVEL IN WATER AT 95°, 85°, AND 75° F

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NMRI Research Report, MF011.99-1001, Report No. 9.*

This experiment was designed to evaluate the physiological changes which result from immersion of subjects in water to neck level for 24 hours at water temperatures of 95°, 85°, and 75° F. It had previously been determined that immersion of subjects in water below 95° F resulted in a heat loss from the body which was compensated by an increase in metabolic rate. Other changes in blood morphology and blood electrolytes had been shown to occur concomitantly with increased urinary excretion of water and electrolytes. Since the previous studies had been carried out over a relatively short period of time, the present experiments were designed to evaluate such changes over a 24-hour period, not only at 95° F water temperature but at lower water temperatures as well. It was found that the three subjects increased their metabolic rate when immersed in 85° F water and were able to maintain a "normal" deep body temperature over the 24-hour period. When immersed in the 75° F water, the increased oxygen consumption due to shivering was insufficient to maintain deep body temperature. In addition, the physiological discomfort of immersion at 75° F and "the spiritual failure" of those subjects caused the experiments to be terminated within 12 hours. The changes in the morphology and electrolyte content of the blood together with the hemoconcentration were associated with increased urinary water and electrolyte excretion and were progressive with time.

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FAMILIAL MYELOPROLIFERATIVE DISEASE —A NEW SYNDROME CLOSELY SIMULAT- ING MYELOGENOUS LEUKEMIA IN CHILDHOOD

*D. L. Randall, C. W. Reiquam, J. H. Githens,
and A. Robinson, Amer J Dis Child 110:
479-500, Nov 1965.*

This report from the University of Colorado School of Medicine and the Denver Children's Hospital describes a severe myeloproliferative disorder with clinical and laboratory findings suggesting chronic or subacute myelogenous leukemia. The disorder occurred in children who were related as first or second cousins all of whom lived in a rural area within a radius of several hundred miles of the southeastern corner of Colorado. The course was variable; early death occurred in three and chronic symptoms in six. Two recovered completely during adolescence after 10-12 years of illness. The disease was characterized by early onset, five to 33 months; the common initial symptoms were weakness, respiratory infections, distended abdomen, history of failure to gain; in some bleeding, purpura, or symptoms of anemia had occurred. Physical findings at the time of the first physical examinations were marked splenomegaly, hepatomegaly, anemia, thrombocytopenia, and leukocytosis. Marked granulocytic and slight erythroid hyperplasia with cell distribution similar to that seen in certain forms of myelogenous leukemia were reported on examination of the bone marrow. However, no leukemic infiltration was seen in sections of the liver and spleen; there was evidence of extra medullary hematopoieses in these tissues. The authors discuss differential diagnoses extensively, particularly leukemia, leukamoid reactions to infections, and myeloid metaplasia and conclude that the findings in these patients indicate that the disease is unlike the other myeloproliferative condi-

The opinions or assertions contained herein are those of the authors and are not to be construed as official or reflecting the views of the Navy Department or the Naval Service at large.

tions of childhood. They emphasize the importance of a critical diagnostic work-up in patients suspected of having childhood leukemia and of withholding antileukemic therapy until an absolute diagnosis is confirmed.

An appendix to the article includes detailed case reports.

EXTRA COLONIC MANIFESTATIONS OF CHRONIC ULCERATIVE COLITIS

F. W. Nugent and N. E. Rudolph, Med Clin N Amer 50: 529-534, Mar 1966.

Extra colonic manifestations of chronic ulcerative colitis are listed as lesions of the joint, skin, liver, eyes, kidneys, blood, and nervous system. Musculoskeletal symptoms are the most common extra-intestinal manifestations according to the authors and they describe five types: rheumatoid arthritis, rheumatoid spondylitis, arthralgias, erythema nodosum, and "acute toxic arthritis". Symptoms of the last include swelling, usually in large joints, occurring simultaneously with attacks of ulcerative colitis and if colectomy is performed in these cases, and occasionally the severity of the joint manifestations is the indication for colectomy, complete reversal of the articular changes can be anticipated, according to these authors. In the other types, treatment of the joint manifestations as they would be if ulcerative colitis were not present is recommended.

Two general varieties of complicating liver disease are described, cholestatic and parenchymal. The latter is more common and nutritional deficiency is suggested as the most important etiologic factor, although susceptibility to infectious hepatitis and homologous serum jaundice as well as absorption of toxic material from the colon may play a role. The authors suggest an autoimmune mechanism or portal bacteremia or both to cause the cholestatic variety.

Among the skin lesions, erythemas are most common. Others noted are papular, pustular dermatitis, aphthous stomatitis, neurodermatitis, herpes zoster, and pyoderma gangrenosum.

Eye lesions mentioned are conjunctivitis, iritis, corneal ulceration, keratitis, blepharitis, and Sjögren's syndrome. The relationship here may be a nonspecific association with chronic debilitating disease rather than specific connection with ulcerative colitis.

Thrombophlebitis occurs not uncommonly. Anemias: megaloblastic, dimorphic, hemolytic; and eosi-

nophilia may develop. Drugs or other nonspecific factors may be responsible.

Renal lesions consisting of endothelial proliferation, (glomerulitis), tubular degeneration, albuminuria, deposition of calcium in tubular epithelium, pyelonephritis, and renal calculi are described.

The authors do not believe that psychological factors are primary etiologic agents; they emphasize the profound secondary influence of the emotions in this disease and note that depression with suicidal intent may be seen and that schizophrenic episodes may be precipitated—apparently in patients prone to this disorder.

PSEUDO-ULCER AND TRUE PEPTIC ULCER A CLINICAL, RADIOGRAPHIC AND STATISTICAL FOLLOW-UP STUDY*

Einar Krag MD, Acta Med Scand 178: 713-728, Dec 1965.

The pseudo-ulcer syndrome (Pyloroduodenal irritability—Bochus) according to the author is defined on the basis of clinical and radiographic criteria and the term is more or less synonymous with such diagnoses as gastro-duodenitis, pylorogastritis, gastritis, etc. According to prior investigators, the distinction between it and peptic ulcer is not possible clinically, only by a barium meal. The article includes a review of the literature and then analyzes a series of 174 patients who were discharged from the Department of Medicine, Aarhus Amtssygehus with the diagnosis of gastroduodenitis, pylorogastritis, or gastritis during the years 1936-1945 as to age distribution, sex distribution, duration of symptoms, and gastric acidity. In 1963, the patients that could be reached, 160, were restudied. All of the patients who developed duodenal or gastric ulcer, 69, except one, are in the follow-up study group, all patients who had died or had gastric surgery were followed to death or operation; those who were alive and had not undergone gastric operation were requested to return to the hospital for an interview and barium meal examination.

The follow-up study indicated that true ulcer developed in 40 percent of the patients and that the development of true ulcer is significantly more frequent in patients with pseudo-ulcer than in the general population.

In his recapitulation, after a statistical analysis of the factors which may exert an influence on the prognosis in pseudo-ulcer, the author states that pseudo-

* From the Department of Medicine, Surgery, and Diagnostic Radiology, Aarhus Amtssygehus, Denmark.

ulcer represents a special course of "ulcer disease" with a better prognosis than true ulcer even though the latter may develop in an appreciable number of patients. He does not think that it is correct to regard pseudo-ulcer as a precursor of peptic ulcer, rather, in his opinion, it is more correct to conceive the syndrome as an independent disease entity.

FROZEN BLOOD

LCDR C. Robert Valeri MC USNR*, *N Eng J Med* 275: 365-373, Aug 18, 1966 and 275: 425-431, Aug 25, 1966.

LCDR Valeri, in this two part article, reviews the developments in the long term preservation of human red cells with the use of freezing technics, discussing primarily the safety and efficiency of the biologic product resulting from each of the current processes under investigation. It is a technically clear presentation of the problems encountered in the investigations of methods which are now current for freezing erythrocytes—slow freeze and rapid freeze; thawing methods—slow thaw and rapid thaw; and of the types of additive—penetrating: glycerol, and non-penetrating: polyvinylpyrrolidone, with and without albumin; and lactose, albumin and dextran. He lists the required information for determination of the clinical acceptability of previously frozen red cells as: in vivo survival of preserved cells, mode of removal of nonviable cells (removal associated with or without hemoglobinemia), total amount and state of the supernatant hemoglobin, total amount of extracellular potassium (mEq/unit), presence of significant number of red-cell membranes (ghosts and remnants), concentration and toxicity of additives remaining in unit, and the sterility and pH of the unit.

He comments on the continuing evaluation of the practicability of a frozen-blood supply to supplement ACD-preserved blood in Vietnam, initiated by the Navy's Bureau of Medicine and Surgery in the hospital ship USS REPOSE and at Danang and states that while difficulties involving processing of the product remain to be resolved, the results of the study are very encouraging at this time.**

*LCDR Valeri is Officer in Charge, Naval Blood Research Laboratory, U.S. Naval Hospital, Chelsea, Mass.

**Other recent current articles about Frozen Blood appear in *Surgery* 60-84, July 1966—Charles E. Huggins, and in *Anesthesiology* 27: 483-493, July-August 1966, —J. L. Tullis and F. J. Tionetti, and the same issue of *Anesthesiology* includes a symposium on Blood & Blood Replacement, 14 articles.—Editor.

NEAR-DROWNING: ITS PATHOPHYSIOLOGY AND TREATMENT IN MAN

LT George E. Griffin MC USN, *Milit Med* 131: 12-20, January 1966.

The author reviews extensively the investigative work which has been done using animals and the pathophysiologic studies of humans who have drowned, died after near-drowning (delayed-drowning death), and who have survived after near-drowning. In his conclusions regarding these studies he states that there is a distinct difference in the effects of submersion on animals and humans, especially in cases of fresh water submersion, that the species difference seems to be mostly quantitative rather than qualitative with respect to induction of pulmonary, cardiac, volumetric, osmotic, and electrolytic changes, that the mechanisms operative in the human drowning victim which tend to protect him from the drastic changes seen in experimentally drowned animals are obscure, that the reaction of the human body to submersion is almost entirely on the basis of hypoxia, pulmonary edema and aspiration (salinity of the water plays an insignificant role in the production of the pathophysiologic changes of near-drowning in humans), and that it is dangerous to base our rationale for the treatment of the human near-drowning victim on the pathophysiology noted in the experimental drowning of animals.

He discusses treatment of near-drowning in man under the headings "On the Scene Therapy", "Hospital Therapy", and "Late Therapy." Resuscitation by mouth-to-mouth breathing and closed chest cardiac massage is the most significant part of on the scene therapy. Resuscitation, he states, should be started as soon as the victim is reached, for a few lung inflations with 18 percent oxygen of the rescuers expired air while the victim is still in the water or being dragged ashore, will aid in preventing changes which might be irreversible, even with 100 percent oxygen after a few minutes delay. He emphasizes that little time should be spent in examination but that these measures should be started at the soonest moment possible and should be persisted in, even though apnea and circulatory arrest may have existed for a prolonged period. He cites the complete recovery of a five year old child submerged for 22 minutes who required two hours of mouth-to-mouth resuscitation and closed chest cardiac massage before spontaneous respiration and cardiac function returned.

Hospital treatment includes intermittent positive pressure breathing with 100 percent oxygen, the use

of antifoaming agents in conjunction with positive pressure breathing, tracheostomy if aspiration of significant amounts of a particulate matter or vomitus is suspected. Use of rapidly acting digitalis preparations to combat ischemic myocardial failure and to lessen the amount of pulmonary edema may be necessary and morphine sulphate if the attendant danger of respiratory arrest is considered and proper precautions taken. Early treatment of the effects of cerebral edema-osmotic therapy and hypothermia, plasma infusions, decompression of the stomach, prophylactic antibiotics and systemic steroids in all cases of suspected aspiration are essential. He advises against the use of hyper- or hypotonic saline solutions, in the absence of laboratory evidence of electrolyte derangements, to correct abnormalities expected on the basis of animal experiments. The use of THAM or a bicarbonate preparation to correct anoxic acidosis may prove of value in selected cases but as a rule will not be necessary. Gradual decrease in the oxygen percentage as well as the pumping pressure as blood oxygenation and pulmonary edema allows are advised since 100 percent oxygen for long periods can act as a pulmonary irritant.

Late therapy includes the same as that for any injury in which there are late manifestations of anoxia and treatment for psychological trauma if this is necessary. Most individuals, he states, who survive the first 24 hours after rescue will go on to make an adequate recovery and there are a number of cases of coma lasting over two weeks which have eventually gone on to make a complete recovery. The timely treatment of cerebral edema to prevent brain anoxia is stressed. (LT Griffin is a Qualified Submarine Medical Officer.—Editor.)

SKIN AND SCUBA DIVING FATALITIES IN THE UNITED STATES

*Daniel P. Webster, Pub Hlth Rpt
81: 703-711, August 1966.*

Skin and scuba diving are undergoing phenomenal growth as recreational sports and both have unusually serious accident potentials. D. P. Webster*, in an article, "Skin and Scuba Diving Fatalities in the United States" published in the August issue of Public Health Reports, compares these with the calculated risks in sky diving, spelunking, mountain climbing and automobile racing. He suggests moreover, that skin and scuba divers, as proficiency in-

creases, seldom remain content with casual diving in so-called "safe" water of limited depths but constantly attempt more exciting and hazardous feats including self-competition for greater depth and duration of dives.

A deterrent to emphasis on accident prevention, he feels, has been the lack of data on the extent and circumstances of underwater diving fatalities. He conducted a study of newspaper reports (death certificates seldom provide complete accident information) of diving fatalities of Americans which occurred in the U.S. and foreign waters in 1965 and was able to identify 86 victims and determine the principal factors in the accidents. Incidents involving Armed Services personnel during combat or military operations were not included in the study.

Florida and California of the 50 states led the fatalities. Skin diving accounted for 26 drownings, 24 of these were males; and scuba diving accounted for 60, 58 of whom were males. Almost half, 42 of the 86 reported fatalities, happened in oceans, gulfs, bays, and other large bodies of ocean water; 17 in small lakes and other inland bodies of water; 11 in pits, caves, mines, quarries, openings, or excavations; eight in rivers or streams; three in major lakes, dams, or reservoirs, three in swimming pools; and two in one of the Great Lakes.

In 46 of the drownings exhaustion was mentioned as the proximate cause of death; entrapment or entanglement under ice and underwater ledges, in kelp, and in various lines resulted in 16 drownings; sinking objects in the water were related to three deaths; being swept into deep and dangerous water was related to two. Only one diver was reported to have drowned as the result of a cramp.

In virtually all of the accidents, the victims' disregard of one or more of the recognized rules or procedures for safety was found to be a contributing cause: overestimation of ability by the divers, solo diving, swimming or working underwater at a distance from the diver's partner, diving in threes (in this situation divers do not have individual partners for protection and assistance in emergencies), physical conditions (one was paraplegic and one was known to have had a few beers), lack of equipment or defective equipment, unfamiliar or borrowed equipment, diving under adverse weather or water conditions.

Revival chances were poor; 30 minutes elapsed before two-thirds of the victims were found.**

*Mr. Webster is acting Chief of the School and Recreation Section, Division of Accident Prevention, Bureau of State Services, Public Health Service.

**See Medical News Letter 43: 15-18, 7 February 1964 for Basic Physiology in Scuba and Skin Diving, 43: 12-15, 21 February 1964 for Clinical Problems of Scuba Diving and 47: 23-26, 21 January 1966 for Safe Practices for Industrial Scuba Diving.—Editor.

DENTAL SECTION

PROPERTIES OF SILICATE CEMENTS MIXED BY HAND AND MECHANICAL MEANS

Phillips, R. W., Swartz, M. L. and Chong, W. F. J So Cal Den Assn 33(5): 239-242, May 1965.

Four commercial brands of silicate cement were studied: two conventional ones, one containing glass fibers, and one advertised as specifically designed for use in a mechanical amalgamator. For mechanical mixing, a gelatin capsule containing measured portions of powder and liquid was inserted in the holder of the Wig-L-Bug amalgamator. No pestle was used. Hand-mixed specimens on a chilled glass slab were used for comparison. Three powder-liquid ratios were tested with each brand: 3.0, 3.75 and 4.25 gm/ml. Compressive strength, solubility and disintegration characteristics were similar for experimental and control specimens; alternatively, these characteristics varied with the powder-liquid ratio. With all four brands, the setting time after mechanical mixing was approximately half that of comparable hand mixes. In general, these findings are in agreement with others in that mechanical mixing had no adverse effect on strength or solubility of silicate cements. Despite the fact that the physical properties of mechanical mixes prepared with the high powder-liquid ratios were relatively unaffected by variations in mixing time, it was noted that the homogeneity of 20 second mixes routinely was superior to that of 10 second mixes. However, when mixes of usual clinical size were tested (0.3 gm powder), 10 seconds seemed to provide sufficient mixing time. Difficulty was experienced with the brand containing glass fibers, in that mechanically mixed samples tended to have the glass fibers separated from the remainder of the mix, and they were difficult to manipulate. The other three brands were similar and satisfactory in all characteristics, in either mechanical or hand-mixed specimens. The rapid set in all tested brands after mechanical mixing could pose some inconvenience in clinical working time. However, it was possible to extend the setting time by using cooled powder and liquid. The authors believed that use of the mechanical amalgamator for mixing silicate cements offers an important means of standardization. The powder-liquid ratio's effect on physical properties is perhaps the most important feature of this advantage.

Editor's Note: Dental officers in SEASIA are currently experiencing difficulties with dental materials due to the continuous high temperature and humidity in their operating rooms. This is particularly true of the silicate cements which set too rapidly and when set are chalky in texture; a natural consequence of the liquid being exposed to the moist atmosphere. If small refrigerators could be supplied (purchased) and capsules, prefilled with the cement powder, for mixing in the mechanical amalgamator could be stored in this lower temperature, along with the liquid, the technique discussed in the above article might alleviate some of the current difficulties. However, it is essential to use cooled powder and liquid to reduce the heat generated during mechanical mixing which would otherwise further accelerate the already too rapid setting time. The small refrigerator could also be used for storage of the other materials affected by the unusual atmosphere.

STRUCTURE STUDIES OF AMALGAM. II. EFFECT OF BURNISHING ON THE MARGINS OF OCCLUSAL AMALGAM FILLINGS

Kanai, S., Acta Odont Scand 24(1): 47-53, May 1966.

In current widely held opinion, burnishing of amalgam is considered contraindicated because excess mercury at the surface, and particularly margins, would cause undesirable properties in the resultant restoration. Because this premise has been based on logic but has not been supported by published experimental evidence, this study was conducted to investigate the effect of burnishing upon the structure and mercury content of occlusal amalgam restorations. Cylindrical cavities with a 120° cavo-surface angle were prepared in acrylic resin blocks. A standard mix of amalgam was inserted by a controlled condensation method. Two groups of ten restorations were studied. Group A were filled with an excess of amalgam; on one side of the cavity, excess was removed by repeated burnishing from the center to the margin; on the other side, excess was cut away with a sharp knife. Group B cavities were filled flush with the cavity margins; one side was burnished; on the other side, the margin was left untouched. The specimens were embedded and sectioned through an axis vertical to the surface, and the section surfaces were polished, etched and photo-

microphotographed. The burnished margins had a higher percentage of residual alloy grains, and a lower percentage of micro-pores. This indicates a reduction in mercury in burnished amalgam surfaces, rather than an increase as commonly believed.

Editorial comment: This is believed to be the first published experimental evidence to indicate a possible advantage gained by burnishing amalgam surfaces. Until this rather startling evidence is con-

firmed by a second, independent study, burnishing should not be recommended. This abstract is presented for information and background for anyone with a capability to explore the subject further. Should further published research support the concept that burnishing enhances the properties of amalgam surfaces, it may become desirable to adopt as standard practice, to improve the amalgam restoration.—Submitted by CAPT N. W. Rupp DC USN.

PERSONNEL AND PROFESSIONAL NOTES

PROFESSIONAL MEETINGS. In recent years, this section of the *U.S. Navy Medical News Letter* has been used to publicize the participation of naval dental officers in civilian professional activities. The origin of this information has been reports to Bureau of Medicine and Surgery in compliance with MANMED 6-34. To make more *News Letter* space available for publication of other matters, future publication in this section of the *News Letter* will be limited to national and international societies and to selected activities of military relevance.

Continued compliance with MANMED 6-34 is desired; each such item is filed in the dental officer's jacket at the Bureau of Medicine and Surgery, for reference purposes. All officers are encouraged to continue to support and participate in civilian professional activities. This provides excellent public relations for the Naval Dental Corps. Even more important, it contributes markedly to the professional growth of the individual officer.

REQUEST FOR JOURNALS. The U.S. Naval Dental Clinic, Norfolk, Virginia, needs the following copies of journals to complete its library:

Journal of Oral Surgery,
Anesthesiology and Hospital
Dental Service-Vol. 18, No. 5
Dental Abstracts Vol. 6, Nos. 7, 8, 9
Vol. 7, Nos. 3, 6

If anyone has any or all of these editions that he would care to donate, please contact the Commanding Officer, U.S. Naval Dental Clinic, Norfolk, Virginia 23511.

SAFETY DURING PROPHYLAXES. During the past 18 months, a study has been conducted at the U.S. Naval Dispensary, Washington, D. C., to determine the frequency with which prophylactic paste debris enters the orbital area of both patients and operators during the polishing phase of a complete prophylaxis. It was found that even the most careful operator is unable to entirely confine the prophylactic paste to the oral cavity. This was demonstrated by the frequency with which debris was found on glasses worn by both the operator and patient. It was concluded that the patient's and operator's eyes should be protected by goggles or glasses during the polishing procedure particularly when the prophylactic paste contains stannous fluoride.

To provide this protection to those without glasses, an inexpensive GSA goggle is recommended. This goggle is highly acceptable to the patient and operator and can be washed with soap, immersed in Benzalkonium chloride, wiped with alcohol, etc., without damage.

FSN	NOMENCLATURE	U/I	U/P
4240-276-7343	Goggle, Industrial	pair	\$.43
	All Plastic Safety		

—Submitted by CAPT Arthur S. Turville DC USN.

AEROSPACE MEDICINE SECTION

CHANGE OF COMMAND AND RETIREMENTS AT AEROSPACE MEDICAL CENTER, PENSACOLA, FLORIDA

On 5 July 1966, RADM J. L. Holland MC USN, retired after 36 years of naval service and relinquished command of the Naval Aerospace Medical Center to RADM H. A. Eighmy MC USN. A highlight to his long and illustrious career as a leader in Aviation Medicine was the citation of RADM Holland with the Legion of Merit Medal, presented in behalf of the Secretary of the Navy by VADM Heyward, Commander, Naval Air Training Command. RADM and Mrs. Holland will reside in Pensacola.

RADM Eighmy has been serving in the Bureau of Medicine and Surgery as Assistant Chief for Personnel and Professional Operations.

CAPT Ashton Graybiel was also honored at retirement ceremonies on 31 June 1966 after 25 years of service. CAPT Graybiel was assigned to the Naval School of Aviation Medicine (now Naval Aerospace Medical Institute) in 1942 and has been Director of Research since 1945. He has been particularly active in cardiovascular and vestibular organ research as they relate to aviation and space medicine. He is a recognized international authority in these fields and author of numerous scientific publications. CAPT Graybiel is a past president and Fellow of the Aerospace Medical Association, Diplomate of the American Board of Preventive Medicine, and recipient of numerous honors and awards for his scientific work. He will remain as the Director of Research at the Naval Aerospace Medical Institute in a civilian status.—AeroMed, BuMed.

CAPT WAGNER RETIRES AND CAPT IRELAND ASSUMES DIRECTORSHIP OF ACEL

CAPT Roger G. Ireland MC USN, became the Director of the Aerospace Crew Equipment Laboratory at the Naval Air Engineering Center, Philadelphia, Pennsylvania, effective 1 September 1966. He succeeded CAPT Henry G. Wagner who retired from the naval service.

CAPT Ireland has served as Deputy Director of the ACEL since 1964 when he reported from the

USS Forrestal where he was Senior Medical Officer.

He received his Doctorate of Medicine in 1948 from the University of Colorado, and Master of Public Health degree from Johns Hopkins University in 1960.

CAPT Ireland was designated a Naval Flight Surgeon at the Naval School of Aviation Medicine (now Naval Aerospace Medical Institute), Pensacola, Florida in 1952.

Doctor Ireland is certified by the American Board of Preventive Medicine (Aviation Medicine) and is a Fellow of the Aerospace Medical Association.

CAPT Wagner, who was assigned to the Naval Air Engineering Center more than two years ago, was born in Washington, D.C., where he attended secondary and high school, received a Bachelor of Arts degree in 1939 and a Doctorate of Medicine in 1942 from George Washington University. In 1949 he received a Certificate of Ophthalmology from the Graduate School of Medicine, University of Pennsylvania. From 1949 to 1953 he was a Fellow of Biophysics at Johns Hopkins University.

CAPT Wagner was Honorary Professor, Biophysics Department, Johns Hopkins University, 1956, 1960 and 1962; Fellow, American College of Preventive Medicine (Aviation Medicine), 1956.

He is a member of the American Medical Association, Aerospace Medical Association, American Physiological Association; Vision Committee, National Research Council, Washington Academy of Medicine. CAPT Wagner and family will reside in the Washington, D.C. area. (From *Air Scoop*, NAVAIRENGCEN, Vol. 14(17), Aug 26, 1966.)

ARMY-NAVY JOINT AEROSPACE MEDICAL HELICOPTER RESEARCH PROJECT

The U.S. Army has recently turned over to the Naval Aerospace Medical Institute a special aerospace medical research project, and two Army flight surgeons will be assigned to Pensacola, Florida in connection with this. Since this project involves a good deal of Army equipment and extensive use of helicopters, a Naval flight surgeon has been assigned to the U.S. Army Aeromedical Research Unit, Fort Rucker, Alabama, for Navy liaison.—AeroMed, BuMed.

SPIN SIMULATION PROGRAM

An F-4 cockpit which has been stripped of non-essential parts and cut down to appropriate external size recently was mounted on a centrifuge gondola jig preparatory to static testing as part of the Aerospace Medical Research Department's Spin Simulation Program at the U.S. Naval Air Development Center, Johnsville, Warminster, Pennsylvania.

Later in the program the fully instrumented cockpit assembly with completely operational aircraft instruments will be mounted in the gondola of the Dynamic Simulator and will be flown on the computer controlled centrifuge. For the first phase of the feasibility study the centrifuge and gimbal drives and the converted aircraft instruments will be driven by DC signals recorded during actual F-4 aircraft spin flight tests.

This work is being done as part of an investigation by the Dynamic Simulation Division into the feasibility of simulating aircraft spin maneuvers utilizing instruments and controls that dynamically reproduce conditions found in actual spin situations coupled with a force environment that imposes physiological and psychological stresses on the pilot. (Aerospace Medical Research Department, Naval Air Development Center, Johnsville, Warminster, Pennsylvania.)

AVIATION EXPERIMENTAL PSYCHOLOGY IN THE NAVY

In the last issue of the Navy Medical News Letter the course of instruction for newly commissioned experimental psychologists and the research program being pursued at the Naval Aerospace Medical Institute were described. This issue will be devoted to the work of the Aviation Experimental Psychologists assigned to the Naval Air Systems Command and its field activities.

Naval Air Systems Command

The Aviation Experimental Psychologists assigned to the Naval Air Systems Command, Crew Systems Division, are responsible for monitoring the human factors programs on weapon systems and subsystems. They initiate and monitor supporting study efforts to provide the human factors engineering data so necessary in systems design and development. They also provide human factors data to officers responsible for the development of weapon systems such as A6A, A-7, Phoenix, Walleye, etc. An important part of their job is to provide support to the Avionics Division in the evaluation of vertical displays, heads-

up displays, engine instruments, electronic counter measures, and integrated flight directors. In their role as monitors of the extensive "in-house" research and development program of the Naval Air Systems Command they work closely with those Aviation Experimental Psychologists assigned to the Naval Air Development Center, Naval Air Engineering Center, and the Naval Missile Center.

Naval Air Development Center

Research at the Psychology Division of the Aerospace Medical Research Department, Naval Air Development Center, Johnsville, Pennsylvania, integrates two avenues of approach which uniquely illustrate the dual nature of that laboratory. Scientific support is provided for both the Naval Air Systems Command and the Bureau of Medicine and Surgery. While these two channels emphasize different approaches it is felt that much of the medical research data will eventually find application in providing parameters for future design of weapon systems, instrumentation, crew equipment, and related hardware.

A brief review of past studies at the Aerospace Medical Research Department will point out the varied research roles assumed by the Psychology Division. The Weapon Systems Support Branch has lent support in the areas of human performance measurement and crew station design to the Navy's effort in the Manned Orbiting Laboratory program. These personnel have also tested and evaluated a pilot-restraint system for protection against impact acceleration, and developed a light-weight, high-G protective device. At present, they are formulating human performance specifications for a carrier-based early-warning aircraft, and are working in conjunction with the ASW group in designing the A-NEW Mod. 4 aircraft.

The Vision Branch has concerned itself with the determination of the basic physiological and psychological aspects of flashblindness in order to provide specifications for the design and manufacture of flashblindness protective devices. In addition, prototype devices are evaluated in terms of crew performance (e.g., ability to interpret flight charts involving varied light levels and color-coding). Present projects of this branch include retinal photography during acceleration utilizing the human centrifuge.

The Human Factors Branch was intimately involved with the development of a program utilizing the human centrifuge for the purpose of providing a simulation device to train the Mercury, Dyna-Soar, Gemini and Apollo astronauts. The centrifuge was

programmed to enable the astronauts to practice routine and emergency procedures while undergoing realistic acceleration profiles. Presently, this branch is studying the effects of severe air turbulence upon pilot-performance employing the centrifuge as a dynamic simulator of high-speed jet transport aircraft. Past projects not involving the human centrifuge include a crew-placement study which resulted in the present crew positions in the A-NEW Mod. 3 aircraft, and a supporting study involving measurements of the ambient sound-pressure levels associated with this new configuration.

Present non-centrifuge projects involve research in the area of auditory warning signals, and the effects of acceleration upon audition; a corollary of the latter study is an attempt to determine the angular positions of the basilar membrane with respect to external "features" of the head. Future research in this branch will employ a newly acquired F-1-1 B static flight simulator to assess the effects of mission duration and task loading upon operator performance.

Naval Air Engineering Center

Aviation Experimental Psychologists at the Aerospace Crew Equipment Laboratory work with teams of engineers, flight surgeons, physiologists and other specialists in developing design criteria and standards for aircrew support, safety, survival, and escape systems. This effort includes the human factors engineering of airborne equipment and weapon systems. A major effort of the laboratory is its basic research program which is necessary to support the development of prototype systems. Once this research is completed and the system tested, the manufacture is turned over to private industry.

Psychologists at this activity are assigned to the Human Engineering and Psychology Research Teams. Past research of the Psychology Research Team has consisted of studies to devise new techniques for the measurement and analyses of muscle action potentials and the effects of various types of work on these measurements. It has also studied the effects of work conditions, isolation, and task difficulty on alertness, vigilance, decision making and other related processes. Present studies of visually mediated spatial behavior in man are being conducted.

The primary objective of the Human Engineering Team is to conduct basic and applied research in the fields of human engineering, engineering psychology, vision, kinetics, biomechanics, anthropometry, and simulation techniques.

Design, standardization, test and evaluation of interior and exterior aircraft lighting systems is a major program of the Human Engineering Team. Currently a study is underway to determine the night visual requirements for aviators and crewmen in the various stages of flight operations from takeoff to landing. Another aspect of interior lighting involves the effects of high intensity light exposure such as a nuclear blast on the pilot's performance of visual tasks. It is anticipated that with modifications in the light intensity, distribution, and control of the interior lighting systems any deleterious effects can be minimized. The Human Engineering Team acts as the technical representative at aircraft lighting mock-ups for the Department of Defense Aircrew Station Standardization Panel, International Aircrew Station Coordinating Committee, and the NATO Working Parties.

Through the efforts of the Human Engineering Team, standardized integrated anthropometric devices have been designed and sent to the measuring stations. When the various physical dimensions of the aviation population have been determined, these data can be used for the design of cockpits and protective equipment.

The Human Engineering Team is the technical representative for the design of flash and thermal personnel protective systems against nuclear weapons. These include various types of protective lenses and thermal shields, and their integration within the weapon systems. It must also prepare the technical documents for use, servicing and storage of these devices.

The Human Engineering and Psychology Teams collaborate in the study of common problems and support other groups within the laboratory in the design, test and evaluation of equipment.

Naval Missile Center

Aviation Experimental Psychology at the Navy Missile Center is primarily concerned with the human factors in the development, test, and evaluation of air-to-air and air-to-surface weapon systems. Current systems under extensive study include AWG-10 (an improved F4B/Sparrow System), Walleye, Condor, Arm and Shrike. The effort is directed from the Human Factors Engineering Branch of the Systems Integration Division which also includes analysis and simulation capability. The human factors effort begins with assisting in specification preparation, continues through development, test and evaluation, fleet introduction, change evaluation, and ends only with the retirement of the sys-

tem. Effort is concentrated in ensuring adequate human factors systems analysis and operator/hardware interface design during system development and the design and execution of a test plan to evaluate the system. This requirement has led to the design and utilization of special instrument pods for in-flight recording as well as mobile vans for pre and post flight testing and for briefing and debriefing pilots. One human factors van, especially designed to assist in the evaluation of electro-optical systems, contains a complete closed loop television system including film projection, video tape recording/playback, and a scoring system to permit both a flexible testing device and a mobile laboratory to bring experiments to the subjects.

Recognizing that work exclusively on testing and evaluation would lead to scientific stagnation, the branch, with the support of the command, has developed and undertaken long range analyses and simulation programs of basic display/control parameters related to airborne systems. Associated with these is the development of new techniques to measure human performance. The lack of adequate methods to measure human performance has been a serious handicap in system evaluation. These new

techniques range from eye motion/fixation recording devices to EMG recording of covert responses. The utilization of computers for data reduction is also being undertaken, especially in the area of relating developed operator performance measures with total system performance or effectiveness. These projects have resulted in the installation of a dynamic simulator platform (six degrees of freedom), a basic control loading system (providing independent control of each parameter), digital and analog display generators, real-time performance measurement system and a mock-up of crew station controls and displays. When fully operational (mid 1967), this facility will permit a wide range of system and subsystem simulation capability with high quality control of input and measures of output for a variety of airborne platforms. It is hoped that this will lead to feasible methods of estimating operator costs for trade-off and cost-effectiveness studies. Advance analytical techniques are being investigated for incorporation in future development contracts.

In the next issue of the Navy Medical News Letter the contributions of the Aviation Experimental Psychologists to the Navy's ASW effort will be described.—AeroMed, BuMed.

EDITORIAL DESK

MEDICAL ENTOMOLOGY MANUAL

There is a continuing need in the naval service for copies of the Medical Entomology Manual, published by the U.S. Naval Medical School, National Naval Medical Center, Bethesda, Maryland. The supply of this manual is now exhausted at that command, where it is currently being revised. Individuals holding unused copies of the Entomology Manual are requested to forward them to the Commanding Officer, U.S. Naval Medical School, National Naval Medical Center, Bethesda, Maryland 20014, in order that the more urgent requests for copies may be satisfied.—U.S. Naval Medical School, NNMCMC, Bethesda, Md.

NAVY NURSE CORPS SENIOR NURSE RETIRES

After thirty years of illustrious service, CAPT C. Edwina Todd NC USN retired on 1 September 1966 at an impressive ceremony at the U.S. Naval Hospital, Portsmouth, Virginia. During her career,

which commenced in July 1936 at the U.S. Naval Hospital, Mare Island, California, CAPT Todd has been awarded the:

Bronze Star from the U.S. Army for meritorious achievement, while in hands of enemy in caring for the sick and wounded.

Gold Star (in lieu of a second Bronze Star) from the U.S. Navy for heroic service during the bombing of the Philippines and capture of her unit.

Army Distinguished Unit Badge with Oak Leaf Cluster.

American Defense Medal.

Pacific Asiatic Theater Medal with two Stars.

Philippine Defense Medal.

Philippine Liberation Medal.

A Letter of Commendation from the Treasury Department for her outstanding contribution in selling war bonds in Southern California.

CAPT C. Edwina Todd was assigned to many Naval hospitals during her career and served on all levels of nursing service, including many years as Chief Nurse. She was captured by the Japanese,

along with eleven other Navy Nurses while on duty at the Naval Hospital, Canacao in the Philippine Islands and was interred in Japanese prison camps for thirty-eight months until liberated in 1945. During the Korean Conflict she served as Chief Nurse on the USS CONSOLATION operating in Korean waters.

CAPT Todd is a graduate of Pasadena Hospital School of Nursing and Columbia University. She holds a B.S. Degree in Nursing Education and a M.A. Degree in Nursing Service Administration. At her retirement ceremony she was awarded a Certificate of Merit by VADM Robert Brown, Surgeon General, U.S. Navy. ADM J. L. Yon MC USN, Commanding Officer of the U.S. Naval Hospital, Portsmouth, Virginia, presented CAPT Todd with a plaque inscribed with all her duty stations.—Nursing Div, BuMed.

CAPT H. S. ARNOLD AWARDED LEGION OF MERIT

CAPT Homer Stuart Arnold MC USN, has been awarded the Legion of Merit by the President of the United States.

The award was made in ceremonies held 8 September at the U.S. Naval Hospital, St. Albans, New York, where CAPT Arnold is presently serving as Chief of Thoracic Surgery.

The accompanying citation read, "For exceptional conduct in the performance of outstanding service as Senior Surgeon and Commanding Officer of Company C, First Medical Battalion, in connection with operations against insurgent communist (Viet Cong) forces in the Republic of Viet Nam from 23 July to 23 October 1965 and, subsequently, as Division Surgeon, Third Marine Division from 24 October 1965 to 23 May 1966. Landing with Company C at Qui Nhon in support of the Second Battalion Seventh Marines, CAPT Arnold, then Commander, expeditiously established a field hospital which effectively supported eight-thousand five hundred United States military personnel in the area. Under his inspiring leadership, the field hospital processed an average of 1700 patients each month, on one occasion handling 52 casualties from one combat operation in an eight hour period. During this period, CAPT Arnold actively performed surgery, supervised junior medical officers and cared for Vietnamese nationals. His compassion and medical skill

in handling the Vietnamese patients generated a mutual respect between the local people and United States military personnel. In his subsequent billet as Division, CAPT Arnold was instrumental in the setting up of the Shock and Resuscitation Team concept which provided effective field first aid during combat operations. Also, he was responsible for the assignment of Navy Medical personnel within the Third Marine Division and monitored the adequacy and availability of essential supplies and equipment, ensuring maximum utilization to support engaged forces. His professional skill was particularly commendable in one instance when he served as the supervising surgeon in a delicate successful operation on a patient who had sustained a shell fragment injury of the right ventricle of the heart. His persevering effort throughout, despite constant harassment by Viet Cong sniper fire, mortar attacks and booby traps, contributed greatly to the successful accomplishment of his unit's mission in Viet Nam. By his extraordinary professional ability, inspiring leadership and unfaltering dedication to duty, CAPT Arnold upheld the highest traditions of the United States Naval Service."

CAPT Arnold received his commission in the United States Navy Medical Corps on 24 September 1948.—U.S. Naval Hospital, St. Albans, N.Y.

HM2 PEREZ AWARDED BRONZE STAR

Hospital Corpsman Second Class Manuel N. Perez, USN, has been awarded the Bronze Star Medal for heroism while serving in Viet Nam.

The presentation was made at the U.S. Naval Hospital, St. Albans, New York, where Perez is now a patient for wounds suffered.

The citation accompanying the medal read, "For heroic achievement in connection with operations against insurgent communist (Viet Cong) forces in the Republic of Viet Nam while serving as a corpsman with Company C, Third Reconnaissance Battalion. During the period from 16 to 19 August, 1966, Hospital Corpsman Perez voluntarily participated in a four man reconnaissance patrol which was inserted deep within treacherous territory known to be infested with Viet Cong and North Vietnamese military personnel. With stealth and skill, the patrol members operated clandestinely in the hostile surroundings, obtaining valuable intelligence concerning enemy activity and areas of operation. On the

third day, on a chance engagement, the patrol was subjected to enemy automatic weapons fire from close quarters, and in the initial burst of fire, the radioman was killed instantly and Perez was painfully wounded. As the volume of fire intensified and the enemy force appeared to be developing an encirclement around the patrol, Corpsman Perez and his comrades quickly broke contact and skillfully eluded the numerically superior enemy. Employing classic escape and evasion techniques, the patrol returned to its original landing zone, only to find increased enemy activity. Since the radio had been damaged in the initial action, leaving the remnants of the patrol without vital communications, the men left the only possible landing zone in the area, realizing that any attempt at air evacuation would seriously endanger rescue helicopters and their crews. Despite his intense suffering from his wound, Perez valiantly kept pace with his comrades as they proceeded to evade the enemy and maneuver through the mountainous territory to a known friendly position about five miles away. During a portion of the arduous escape, he served as point for the patrol. Through his determined effort in the ordeal, the patrol's obtained intelligence information was utilized by infantry units to launch a ground action in conjunction with a reconnaissance unit. As a result, a major enemy complex was uncovered, a number of enemy were killed and a significant amount of documents, equipment, weapons and medical supplies confiscated. Hospital Corpsman Perez's extraordinary perseverance in the face of overwhelming odds, uncommon military proficiency and unfaltering dedication to duty were in keeping with the highest tradition of the United States Naval Service."

NAVAL MEDICAL OFFICER AWARDED FRENCH MEDAL OF HONOR

CAPT John H. Stover, Jr. MC USN, Commanding Officer of the U.S. Naval Medical School, Bethesda, Maryland, has been awarded the Medal of Honor of the Armed Forces Medical Service of the Republic of France. The Award was made in the name of the President of the Republic by M. Pierre Messmer, Minister of Defense, on the nomination of General Petchot-Bacqué, Surgeon General of the Armed Forces.

During 1959-1962 while CAPT Stover served as Medical Services Liaison Officer in the Branch Office, Office of Naval Research, London, he had the opportunity to visit many military and civilian medi-

cal activities in France and devoted much effort to increasing the interchange of medical research data between France and the United States. Through the Office of Naval Research he was able to arrange meetings between French and U.S. Personnel with problems of mutual interest, particularly in research, medical education, and the operational aspects of military medicine. He was a frequent visitor to the French Navy Experimental Diving Research Group in Toulon and helped coordinate certain French-American arrangements for studies in deep diving. He was an invited speaker at the Naval Medical School, Bordeaux and the Naval Medical Center (St. Anne's) in Toulon. He presented many informal briefings on various aspects of ONR's program and specific U.S. Military Medical problems to the staffs of many French Institutions.

Since returning to the United States, CAPT Stover has maintained his interest in French Medicine and has received visits from several senior officers of the Medical Department. He particularly admires their educational programs for career military medical personnel.

In accordance with law, the decoration has been delivered to the Department of State to be held in escrow until legislation permitting acceptance has been enacted.—Public Affairs Office, NNMCMC, Bethesda, Maryland.



CAPT JOHN H. STOVER, Jr., MC, USN
—Official U. S. Navy Photograph.

U.S. NAVAL HOSPITALS DONATE BOOKS



CAPT Felix P. Ballenger, Commanding Officer of the U.S. Naval Hospital, Yokosuka presents a sample of some 200 English books to Dr. Kaoru Nakada, president of the Yokosuka National Hospital, Aug. 10. The books were donated by U.S. Naval Hospitals at San Diego, Calif., and Bethesda, Md. Following the presentation Dr. Nakada escorted CAPT Ballenger on a tour of the newly constructed Japanese hospital.

DATES FOR ANNUAL MEETINGS OF THE ASSOCIATION OF MILITARY SURGEONS

The dates for Annual Meetings of the Association of Military Surgeons of the U.S. are announced for the next three years. They are as follows:

1967—November 19-22, Sheraton-Park Hotel, Washington, D.C.

1968—October 20-23, Sheraton-Park Hotel, Washington, D.C.

1969—November 16-19, Sheraton-Park Hotel, Washington, D.C.

This year the 73rd Annual Meeting will be held from November 7-9 at the Washington Hilton Hotel in the District of Columbia, with registration beginning on Sunday, November 6.

General Earle G. Wheeler, Chairman of the Joint Chiefs of Staff will keynote this year's convention theme, "Duty-Honor-Country." Food and Drug Commissioner James L. Goddard, M.D. will present the annual Sustaining Membership Lecture on November 8. A closed circuit live telecast in color from area Federal medical facilities will be featured,

as well as a panel discussion on medical services in Southeast Asia Operations. Various section programs of special interest to dentists, nurses, and medical service corps personnel will liven the whole convention.

The convention offers a fraternal environment with the Chiefs of Federal Medical Services and with over 90 International Delegates. Many Association awards are presented to members in the literary, scientific and professional fields. Over 100 scientific and technical exhibits provide a splendid educational service to all attending.

The Association of Military Surgeons was incorporated by Congress in 1903. It is a fraternity devoted to the advancement of all aspects of Federal medicine,—professional, administrative, and auxiliary, within the Federal medical agencies. Its constituent services include the medical services of the U.S. Army, U.S. Navy, U.S. Air Force, U.S. Public Health Service, Veterans Administration, Reserve officers in these services, and National Guard medics of the various states. It is the medical society of the Federal Agencies.—Association of Military Surgeons, Washington, D.C.

AID TO MEXICAN DIVERS

During a conference of the Submarine and Mountain Medical Research Group in Mexico, attended and addressed by CAPT John H. Schulte MC USN, an American student lost his life SCUBA diving near the Yucatan Peninsula and a Mexican diver suffered paralysis in connection with the same diving excursion. The Mexican diver, who had led many diving excursions, was eventually taken to Key West and treated by Navy physicians attached to the School for Underwater Swimmers at that naval base. The treatment consisted of decompression of the diver by standard Navy decompression procedures. As a result of these events, on request of the Mexican Surgeon General, the Navy will transfer a decompression chamber to the Mexican Navy and two Mexican medical officers will be admitted to the 8-week course in diving medicine provided at the Deep Sea Diving School, Washington, D.C. The American Ambassador to Mexico endorsed these plans, as well as a proposal to provide the Mexican Navy with films and training course syllabus used at the Diving School. This assistance to our neighboring nation will provide Mexico with facilities and knowledge which will enable her better to protect American divers who may be participating in the sport of SCUBA diving in Mexican waters.

DEPARTMENT OF THE NAVY

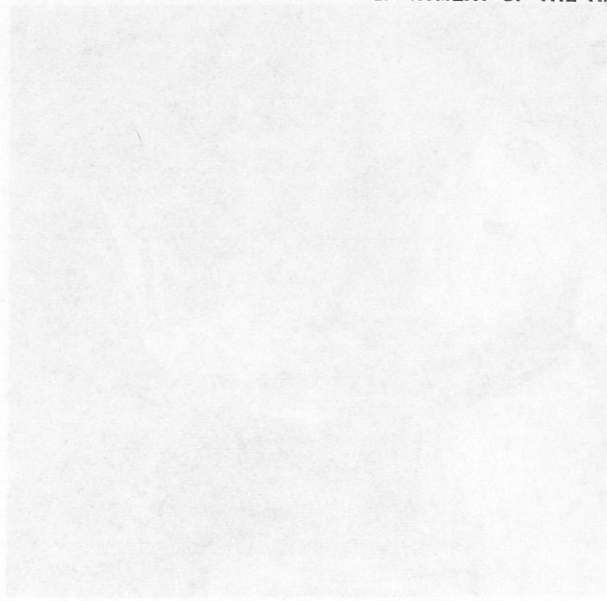
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HOSPITALS DONATE BOOKS



CAPT Felix J. Ballenger, Commanding Officer of the U.S. Naval Hospital, Yokosuka, presents a sample of some 200 English books to the Japanese Naval Hospital, Yokosuka, Japan, during his visit to the hospital. The books were donated by the U.S. Naval Hospital, San Diego, Calif., and Bethesda Naval Hospital, Md. Following the presentation, Dr. Ballenger and CAPT Ballenger on a tour of the hospital and its various departments.

DATES FOR ANNUAL MEETING OF THE ASSOCIATION OF MILITARY SURGEONS
The dates for Annual Meetings of the Association of Military Surgeons of the U.S. are announced as follows:
CAPT CARL E. PRUETT MC USN
ASSISTANT FOR MED & ALLIED SCIENCES
ROOM 5C744, PENTAGON
DCNO (DEAF) 08-075, NAVY DEPT.

This year the 12th Annual Meeting will be held from November 7-9 at the Washington Hilton Hotel in the District of Columbia with registration beginning on Sunday, November 6.
General Felix G. Wheeler, Chairman of the Joint Chiefs of Staff will keynote the year's convention theme, "Drug Abuse-Countermeasures". Food and Drug Commissioner James L. Goddard, M.D. will present the annual Sustaining Membership Lecture on November 8. A closed circuit live television color film from Naval Hospital medical facilities will be featured.

AND TO MEXICAN DIVERS

During a conference of the Submarine and Atomic and Medical Research Group in Mexico, attended and addressed by CAPT John H. Schuber, MC USN, an American student lost in the SCUBA diving near the Yucatan Peninsula and a Mexican diver suffered paralysis in connection with the same diving excursion. The Mexican diver, who had led many diving excursions, was eventually taken to the School for Underwater Swimming at this point. The treatment consisted of decompression of the diver by standard Navy decompression procedures. As a result of these events, an exchange of information between the Navy and the Mexican Navy was initiated. The Mexican Navy will have a 2-week course in diving held at the Deep Sea Diving School, W. Johnston, D.C. The American Ambassador to Mexico will be invited to the course as well as a proposal to provide the Mexican Navy with films and training manuals. The American Navy will provide Mexico with a diver training station which will enable her to train American divers who may be participating in the sport of SCUBA diving in Mexican waters.